Combined Technical Review Comments
Revised Draft Remedial Investigation Report
Remedial Investigation/Feasibility Study
Newtown Creek Superfund Site
Prepared by Anchor QEA, LLC,
dated April 23, 2019

EPA has completed review of the revised remedial investigation (RI) report prepared by Anchor QEA and dated April 23, 2019. The general and specific comments provided in the attached pages include EPA's comments and selected comments submitted to EPA by New York City (NYCDEP), the New York State Department of Environmental Conservation (NYSDEC), and the U.S. Army Corps of Engineers (USACE).

Comments are organized and presented by RI report section (Sections 1 through 9 and the Executive Summary). Comments on figures and tables are included in the sections in which they are referenced. Comments on appendices are provided in separate sections. Comments on figures, tables, and attachments to the appendices are included in the appendices in which they are referenced. Comments on model inputs, outputs, and codes are included in Appendix G – Final Modeling Results Memorandum (FMRM).

In addition to the comments above, broad general comments that apply to multiple sections of the revised RI report or to the entire revised RI report are provided in a separate section named revised RI report General Comments.

Comments related to EPA's previous comments on the draft RI report are referenced to the comment IDs provided in the Anchor QEA comment and response revision matrices dated April 23, 2019. Those comment IDs are identified in the revised RI report comments by their format (e.g., URI.100, NRI.125, NMO.145).

Revised RI Report

General Comments

1. **Selection of Contaminants for In-Depth Evaluation**: In the revised RI report, total polycyclic aromatic hydrocarbons (TPAHs), total polychlorinated biphenyls (TPCBs), and copper (Cu) are discussed in detail for multiple site media. However, other site contaminants, their properties, and their spatial distribution across various media were not discussed in similar detail, as previously requested by EPA.

   Several previous EPA comments suggested the revised RI report should include detailed evaluation and discussion of additional contaminants beyond TPAHs, TPCBs, and Cu. This topic was discussed with EPA and other stakeholders during a meeting held on December 7, 2017. As a path forward, it was agreed that the draft RI report would be revised according to the approach outlined during the December 7, 2017 meeting. The primary elements of that path forward included expanding Section 4.1.2 Selection of Contaminants for In-Depth Evaluation in the revised RI report or adding an appendix to discuss additional potential risk contributors and the similarities and differences in physicochemical properties and spatial distribution of those contaminants with the three primary contaminants (polycyclic aromatic hydrocarbons [PAHs], polychlorinated biphenyls [PCBs], and Cu) that were the focus of the draft RI report.

   Section 4.1.2 of the revised RI indicates that 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,78-TCDD) and dieldrin have similar properties in surface sediment (i.e., both are bioaccumulative and have partitioning characteristics similar to PCBs) and that their distribution in surface sediment is similar to the distribution of PAHs, PCBs, and Cu. However, the revised RI report does not provide similar discussions of the 2,3,7,8-TCDD or dieldrin distribution in other site media, nor does it discuss the properties and distributions of the other contaminants identified by EPA for inclusion in the revised RI. Add detailed discussion of the properties and distribution of the additional contaminants identified by EPA in all relevant site media, including subsurface sediment, porewater, native groundwater, and surface water. The discussion should include further evaluation to support whether the distribution of the additional contaminants are co-located with the primary contaminants (PAHs, PCBs, and Cu).

   This approach is consistent with EPA guidance on preparing RI/FS reports under CERCLA and is necessary for this site. Before focusing in on the primary contaminants driving the risks at this Site, the RI must determine the nature and extent of contamination, including the types of contamination present, the concentrations and the distribution through all meda. This an inclusive part of the RI report, and then the risk assessments help to focus the risk management decisions on those contaminants that are present at concentrations that pose an unacceptable risk to human health or the environment. The additional evaluation required by this comment is not expected to change the conclusions of the RI report in a significant way, but that does not mean that the additional evaluation can be ignored. This is a necessary step for any Superfund site.

2. **Background:** There are numerous references to background, site-specific background, regional background, and urban background in the Executive Summary and throughout the RI report. For example, the RI concludes that contaminant concentrations in surface sediment and surface water indicate conditions in Creek Mile (CM) 0–2 are at (or near) background. References to the various types of background discussed in the revised RI report have not been defined, and site-specific background concentrations have not yet been determined. Remove the terms background (except for the air medium), site-specific background, regional background, urban background, background reference and any similar term from the RI report. EPA is currently drafting a memorandum on the subjects of background and reference areas for Newton Creek that will be distributed to the Newtown Creek Group (NCG) and NYCDEP. This topic will require further discussion after submission of that document.

3. **Feasibility Study (FS) and Risk Management:** The RI report includes several statements and or/recommendations regarding the FS and future risk management decisions. For example, the RI concludes that "…the FS should identify and evaluate remedies that include a combination of remedial approaches, reflecting the unique conditions of each reach." The RI should not draw conclusions that are under the purview of the FS or provide statements regarding items to be considered in future risk management decisions. Such statements should be removed from the RI report. Also, references to remedial alternatives or other aspects of the FS should be removed from the RI report.

4. **Lateral Groundwater Discharge Loading:** Shallow lateral groundwater-borne contaminant of potential concern (COPC) loadings should not be ruled out solely based on the evidence currently provided in the RI. FS-based contaminant fate and transport (CF&T) modeling will include upward adjustment of the current shallow lateral groundwater-borne COPC loadings until the simulations indicate significant impact on model calibration performance. The approach for setting impact thresholds should be discussed with EPA as part of FS CF&T modeling interactions. Results of the CF&T modeling will be discussed with EPA to determine whether they will be incorporated into the final RI report or presented in the FS

5. **Sediment COPC Attribution:** In a number of instances, the RI report attributes contaminant concentrations in sediments to combined sewer overflows (CSOs) and municipal separate storm sewer systems (MS4s) using proximity arguments while not acknowledging the contribution of other current and historical sources to sediment contaminant concentrations. The RI report also indicates that due to the long history of releases in the creek and the dynamic nature of the creek causing the mixing of contaminants from various sources, contaminant concentrations in sediments cannot be attributed to proximate upland sources. If this is true for upland sources (current and historical), it should also be true for point sources at various locations. There are many instances in the RI report where contaminants in sediment are attributed to CSO and MS4 discharges without acknowledging that other sources (including the East River, groundwater discharge, historical spills, discharges, etc.) also likely contribute to the contaminant concentrations in sediment proximate to discharge locations. These

instances are noted in the specific comments; however, the entire RI report should be reviewed and revised to clarify that contaminant concentrations measured in sediments reflect contributions from multiple sources.

6. **Nonaqueous phase liquid (NAPL) Seeps:** In footnote 156, the RI acknowledges that NAPL seeps have been observed near bulkheads and spills and that other discharges have occurred at the creek. However, as indicated in footnote 179, the RI report states that the observed seeps are not considered "primary sources" of contamination because they occur in limited spatial and/or temporal scales. This RI characterization of seeps is done without benefit of any data on the chemical characteristics, volume, or frequency of the seeps' age. The seeps represent a potential ongoing source of contamination to the creek and should be discussed in the report. Move the information in footnotes 156 and 179 into the text of the report. Also, revise the text to acknowledge that there is limited information available to assess the magnitude or impact of the seeps as a potential ongoing source of contamination to the creek. In the absence of such information, seeps and lateral discharges representing potential localized sources will have to be considered during the FS.

7. **Potential Unidentified Sources:** EPA notes that given the multiple COPC sources to the site and despite the various sampling programs undertaken, the potential exists, as it does for all sites, for some sources to remain unidentified following RI/FS activities. As pre-design investigation data are collected and compared to RI/FS datasets, any significant differences between the RI/FS and pre-design investigation datasets will be identified. If this data difference indicates a previously unknown but significant COPC source to the site, it is EPA's expectation that actions to address this source(s) will be incorporated into the remedial design.

8. **Discussion of Sheens and NAPL:** Revise the RI to discuss the nature and extent of sheens in various site media with equal weight as to how NAPL is discussed. While Section 4.6 and its associated figures do present sheen distributions/observations, other portions of the revised RI do not discuss sheens equally with NAPL. For example, Executive Summary Page ES-12 discusses NAPL distributions in subsurface sediments of CM 2+ and the tributaries. However, the Executive Summary text does not discuss the distribution of sheens observed in subsurface sediments, as evidenced by Figure 4-97. As another example, Section 6.4.4.2 Sources of Chemicals to the Surface Sediment states as follows: "Other potential sources of contaminants to the surface sediment include NAPL transport processes, including NAPL migration associated with advection and gas ebullition. NAPL transport processes are discussed in Section 6.4.7, and further detail on gas ebullition is presented in Section 2.3 of Appendix D." Unless the chemical compositions of sheens are known, and as sheens are a potential indicator of NAPL, subsurface sediment sheens should also be acknowledged as a potential source of contaminants to the surface sediment.

9. **Text boxes:** Remove all of the text boxes from the RI report. The key findings in the text boxes oversimplify and overgeneralize the results and findings of the RI report. The executive summary provides a high-level summary of the RI report findings and conclusions.

10. **References to EPA Direction**: The phrase "as directed by USEPA" is used in many places in the document (e.g., five times in two pages in Section 7). All information within the document could be considered to be EPA-directed. Delete the phrase "as directed by USEPA" throughout the document

11. **CSM:** The data and information provided in the RI Report were used to develop and refine the current CSM. However, it should be noted that the CSM will continued to be revised and updated as more data and information become available through the RI/FS process.

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Executive Summary

General Comments

1. The Executive Summary should be revised to reflect and be consistent with the general and specific comments provided for the entire revised RI report.

Specific Comments

1. ES-3, Footnote 3 – Footnote should be removed. It is not clear that "the timing of the CSO controls is an important consideration for the Newtown Creek RI/FS.".

2. Pages ES-17 to ES-18, Risk and Exposure Pathways, first partial paragraph, second sentence (URI.20): The baseline ecological risk assessment (BERA) discussion of the Study Area states, "At these locations, toxicity test results appear to be confounded by other stressors, consistent with urban environments with large CSO and stormwater discharges." Revise the sentence to say, "At these locations, toxicity results appear to be confounded by other stressors." Delete the second part of the sentence as it is not supported by the BERA.

3. Pages ES-20 to ES-21, Key Findings and Conclusions, CM 2+ and tributaries bullets: Both of these bullets end with statements about CSO and MS4 discharges that are not supported. Delete "...but may be influenced by other contaminants common to urban, industrialized waterbodies influenced by large CSO and MS4 discharges." from both bullets.

Section 1 Introduction

Specific Comments

1. Page 11, Section 7 Risk Assessment Summary (URI.34): Revised the sentence as follows: "This section provides a summary of the final BHHRA and BERA…"

Section 2 Program Summary

Specific Comments

1. Page 19, Section 2.1.2 Phase 1 and Phase 2 Reference Areas:

    a. First paragraph, last sentence: Revise the sentence as follows: "The remaining 10 Phase 1 reference areas were retained to provide data on the bulk surface sediment and surface water characteristics for potential use in developing background conditions."

    b. Second paragraph, last sentence: Clarify that the four reference areas cited in the bullets were selected to support the baseline human health risk assessment (BHHRA) and BERA.

2. Page 25, Section 2.1.5.1 Caged Bivalves, first sentence: specify which species was used as part of the caged bivalve bioaccumulation study that was conducted in 2014 as part of the BERA.

3. Page 28, Section 2.1.7 Gas Ebullition, fourth sentence: The text reads as follows: "Sediment, surface water, and porewater samples were collected, and sediment temperature and surface water quality profiles were collected from pilot study stations as described in Sections 2.1.3 and 2.1.4." Clarify if the sediment, surface water, and/or porewater samples were collected as part of the ebullition pilot scale investigation or were collected under separate investigations.

4. Page 29, Sections 2.2.1 and 2.2.2 Additional Data, second and third sentences: Explain in the text what is meant by minimum data acceptance criteria (MDAC) and activity-specific acceptance criteria.

Figures

5. Figures 2-17a through 2-17d: Phase 1 subsurface sediment sample locations (blue half-circle symbol) are not shown or are not visible (obscured by collocated surface sediment samples [blue circle symbol]) on the figures). Add a note to the figure explaining that the Phase 1 surface sediment and subsurface sediment samples are collocated or show the subsurface sample locations on separate figures.

Section 3 Environmental Setting

Specific Comments

1. Page 31, Section 3, fifth sentence: This section does not provide a full discussion of the contribution of groundwater discharge to Newtown Creek. The text indicates that only minor amounts of groundwater within recharge areas discharge to the Study Area through seeps. Revise the text to include the contribution of groundwater flow through the creek bed from the surrounding recharge area.

2. Pages 32-33, Section 3.1.1.1 Geology, final sentence in the section: It is stated that fill materials were placed during industrialization of the area and that the fill material types are heterogeneous. Specifically indicate that the fill materials present in the Study Area likely originated both within and outside the Study Area, and reference other portions of the RI report that discuss filling (e.g., Section 3.2 and Section 3.2.6.21).

3. Page 34, Section 3.1.1.2 Hydrogeology, second complete paragraph, last sentence: "Therefore, some groundwater originates in the fill and post-glacial deposits but generally discharges to the Study Area through the UGA." This sentence implies that discharge through the intertidal zone is negligible. Revise the text as follows: "Therefore, groundwater that originates in the fill and post-glacial deposits either discharges laterally directly into the Study Area or flows down into the UGA before discharging into the Study Area."

4. Page 38, Section 3.1.4 Hydrodynamics, first full paragraph, fourth sentence: The text states that "Groundwater inflow…does not significantly affect hydrodynamic processes…based on initial diagnostic testing with the hydrodynamic model." Since the hydrodynamic model is considered to be nearly finalized at this point and if the conclusion stated in the referenced sentence still holds true, delete the word "initial" from this sentence.

5. Page 39, Section 3.1.5 Water Quality:

    a. Second paragraph: Based on salinity profiles in Section 4.7, salinity measurements during wet weather in the tributaries (Dutch Kills, Maspeth Creek, East Branch, and English Kills) are more variable than those in the main stem of the Creek (CM 0–1 and CM 1–2). Revise the text to reflect the spatial variability in salinity measurements in the main stem versus the tributaries.

    b. Last paragraph, third sentence: Include industrial discharges along with CSOs, wastewater treatment plant (WWTP) treated effluent, stormwater (including overland flow), the East River, and groundwater as factors affecting the water quality in Newtown Creek. Also, the qualifier "to a lesser extent" before groundwater should be removed here and throughout the report until the CF&T modeling of lateral groundwater discharge loading is done.

6. Page 40, Section 3.1.6 Sediment Transport, last complete sentence: As commented previously by EPA on the 2016 draft RI report and as revised in the 2019 version of

Attachment G-G, temporal changes in net sedimentation rate (NSRs) are also a result of changes in localized trapping efficiency. Revise the text to also mention the impact of trapping efficiency on temporal change in NSRs.

7. Page 46, Section 3.2 Human Use, first paragraph, last sentence and Pages 99-100, Section 3.2.6.21 Solid Waste Disposal and Landfilling: It is noted that adjacent marshes were filled. If known, state what types of materials these marshes were filled with and the origin of that fill material (source type and source location with respect to inside and/or outside the Study Area). Notably, Section 3.2.6.21 suggests that marshes were filled with all manner of municipal, commercial, and industrial wastes. State that the fill materials likely originated both within and outside the Study Area.

8. Page 56, Section 3.2.4 Navigation Channel and Dredging History (URI.92): This comment relates to prior comment URI.92, for which the NCG response is partially acceptable. The first sentence of the last paragraph on this page indicates that bathymetric surveys were conducted between 1991 and 2015 and references Section 3.1.3. Section 3.1.3 indicates that bathymetric surveys were conducted between 1991 and 2016. Revise the text to resolve the inconsistency in date ranges for the bathymetric surveys.

9. Pages 84-85, Section 3.2.6.15.2 Contaminants Associated with Petroleum Refining and Bulk Storage: Identify NAPL as likely to be associated with these industries.

10. Page 124, Section 3.2.9 Surface Water Classification, Fish Advisories, and Public Health Assessment, second paragraph, third sentence: The text states that "Due primarily to CSO discharges, much of Newtown Creek and the tributaries consistently do not meet the New York State Department of Environmental Conservation (NYSDEC) Class SD fish survival standard for DO concentration (i.e., never less than 3 mg/L)." Delete the phrase "Due primarily to CSO discharges" or provide supporting evidence in the text that Newtown Creek and its tributaries do not meet the NYSDEC Class SD fish survival standard for dissolved oxygen (DO) concentration due primarily to CSO discharges.

11. Page 125, Section 3.2.9 Surface Water Classification, Fish Advisories, and Public Health Assessment:

    a. First full paragraph, first sentence: State the effective date of the recent amendments by NYSDEC to Part 701.14 for Class SD waters.

    b. First full paragraph, fifth sentence: The text states that New York City Department of Environmental Protection's (NYCDEP's) Waterbody/Watershed Facility Plan Report does not evaluate the feasibility of meeting the total coliform and fecal coliform criteria (NYCDEP 2011a). The relevance of citing this 2011 plan is not clear, particularly in reference to meeting recent amendments to NYSDEC Part 701.14. The more recent NYCDEP Long Term Control Plan for Newtown Creek, dated June 2017, addresses control of total and fecal coliforms and should be referenced in the text.

12. Page 133, Section 3.2.11 Historical Spills, first sentence of the first full paragraph: The text indicates that remedial efforts "may have been installed due to historical spills at various facilities." These remedial efforts clearly have been installed and clearly were installed to

address contamination resulting from releases to the environment. Reword this sentence to read "Other remedial efforts in the Newtown Creek groundwater recharge area that have been installed to address contamination potentially resulting from historical spills include…" In the final sentence of this same paragraph, specify that it is unlikely that the list of sites and remediation systems is an exhaustive list of spills/releases. Consider referencing the data applicability report (DAR), which includes a comprehensive evaluation of historical spills and remediation actions.

13. Pages 133-134, Section 3.2.11 Historical Spills (URI.148): This comment relates to prior comment URI.148, for which the response is partially acceptable. In the bullet for Motiva Brooklyn Terminal, specify the nature and source of the NAPL material for which remediation was implemented.
14. Page 134, Section 3.2.11 Historical Spills (URI.148): This comment relates to prior comment URI.148, for which the response is partially acceptable. In the bullet for the Former Laurel Hill Site, specify the nature and source of the groundwater contamination for which remediation was implemented.
15. Pages 134-135, Section 3.2.11 Historical Spills (URI.148): This comment relates to prior comment URI.148, for which the response is partially acceptable. In the bullet for Waste Management of NY/Steel Equities and for Malu Properties/Former Ditmas Oil/Former Gulf Oil, specify the nature and source of the material for which remediation was implemented.

Section 4 Nature and Extent of Contamination

General Comments

1. A number of new figures have been produced to support the discussion in Section 4. Review the figures to ensure that all legend and footnote descriptions are pertinent and accurate as it appears that figures used as templates to create the new figures may have contained legend entries and footnotes that are not relevant but were preserved.

2. The RI indicates that the partitioning of organic COPCs could be represented using an alternative approach that would result in estimates of groundwater-borne COPC loadings two to six times larger than presented. Therefore, the RI should include presentation of the higher possible loadings, and simulation of vertically upward groundwater-borne COPC loadings during the FS CF&T modeling should incorporate those values. The range of groundwater-borne COPC loading factors now estimated in RI should be discussed with EPA prior to the CF&T modeling. Results of the CF&T modeling will be discussed with EPA to determine whether they will be incorporated into the final RI report or presented in the FS.

3. At locations with vertically nested groundwater monitoring points, values of salinity in groundwater/porewater sampling that are lower than the prevailing Study Area water column salinity are an indication that some amount of fresh groundwater is present. This should be considered and discussed in the report sections that evaluate vertical groundwater/porewater seepage directions.

4. Discrepancies between Tier 1 groundwater balance estimates and the results of Tier 3 should be resolved as should Tier 3 segment-to-segment discrepancies in back-calculated net recharge rates and aquifer transmissivity estimates. The variations in back-calculated net recharge rates need to be justified and resolved.

5. The revised RI includes a more expansive discussion of sheens; however, excluding discussion of sheens where NAPL assessments are discussed is not acceptable. For example, the first sentence on Page 6, Section 1.3 states that “NAPL was not observed in Dutch Kills or Whale Creek sediment” but fails to mention that sheens were observed in both tributaries. Discussions of NAPL distribution in the report should also include discussion of sheen distribution. Revise the document accordingly.

Specific Comments

1. Page 137, Section 4.1, footnote 57, last sentence (URI.153, URI.154, URI.155, URI.156): The revisions made in the revised RI report based on EPA comments on the draft RI report are partially acceptable. Remove the portion of the last sentence starting with”…as wells as pathogens…,” here, and remove any pathogen discussion from the document. Pathogens are not evaluated in the RI report or in the BHHRA or BERA reports.

2. Page 138, Section 4.1.2 Selection of Contaminants for In-Depth Evaluation: In the revised RI report, dioxin/furans, lead, and dieldrin are discussed in detail for the surface sediment

medium but are not discussed in other site media. Revise the document per revised RI report General Comment No. 1.

3. Page 140, Section 4.1.2 Selection of Contaminants for In-Depth Evaluation, first sentence: Dioxin/furans also pose a risk to human health, are primary risk drivers for the site, and should be discussed as primary risk drivers in the RI. See General Comment No. 1.

4. Page 141, Section 4.1.3.1 Subsurface Dataset: There appears to be a discrepancy between footnote 62 and Figure 4-1. Footnote 62 indicates that the nondetects for Aroclors and PCB congeners were set to the method detection limit and TPCBs were calculated using the Kaplan-Meir method, whereas Figure 4-1 indicates (in the footnote) that TPCBs in the regression analysis are all detect values. Explain this apparent discrepancy, and if needed, revise the text and/or Figure 4-1 accordingly.

5. Page 148, Section 4.1.4 Description of Presentation Tools: In the bullet for vertical profiles, specify how vertical profiles other than box plots, which show median values as a representation of central tendency, allow for easy evaluation of the central tendency in the data.

6. Page 149, Section 4.2.2 Percent Fines and Total Organic Carbon, last paragraph: Delete the sentence "Compared with other estuarine inlets…" The creek is similar to several waterbodies in the NY harbor where the only source of freshwater inputs are CSOs and stormwater. The organic carbon (OC) in these tributaries is not as elevated as it is in Newtown Creek. NAPL, petroleum spills and discharges are also sources of OC to the sediments of the creek. Revise the text to identify other sources of OC (such as NAPL, petroleum spills, and others) in addition to CSOs and stormwater as sources of OC to the sediments in the creek.

7. Page 150, 4.2.2.1 Percent Fines: "CSO effluent contains significant amounts of coarse-grained material (based on the whole-water CSO samples; see Section 4.2.1.3 of Appendix E)." Data collected using method D3977 show that there is more fine-grained material than coarse-grained material in CSOs. Percent fines data presented in draft RI Figure 4-10b are from the TAPE method. The TAPE measurements appear to be low in percent fines compared to the SSC method (D3977). Revise the text to include a discussion of both grain size datasets, and identify any potential impacts on the conclusion regarding coarse-grained material near CSOs.

8. Page 150, 4.2.2.1 Percent Fines, second to last sentence: The text states that "The rapid settling of coarse-grained material compared with fine-grained material provides an explanation for the general finding of lower percent fines in sediments at the heads of the tributaries." Percent fines do not show a clear spatial trend as a function of distance from the outfall. There are locations along the tributary where there is coarse material present that does not appear to be related to the outfall location. Revise the text to provide a more detailed explanation of data and the reasons that the data support the conclusion of lower percent fines in sediments at the heads of tributaries or revise the conclusion to more accurately reflect the data.

9. Page 151, 4.2.2.2 Total Organic Carbon, second paragraph: The text states that Coney Island Creek and Fresh Creek Basin have total organic carbon (TOC) levels similar to the tributaries. Because both these reference waterbodies and the tributaries have CSO, the text suggests that CSOs are responsible for the high organic loads in the tributaries. This limited evaluation (only two reference areas) does not support the conclusion that CSOs are the source of elevated OC in the sediments. Seven of the 14 reference areas receive CSO discharges that are similar to tributaries in Newtown Creek. With the exception of Coney Island Creek and Fresh Creek, the other reference areas have lower OC content. For example, Westchester Creek and Flushing Creek have average TOC below 6%, which is consistent with TOC levels in CM 0–2 of Newtown Creek. Include a discussion of the industrial nature of the areas near Coney Island Creek and Fresh Creek and the potential contribution of industrial sources to the observed OC levels in the sediments of those reference areas.

10. Page 157, Section 4.2.3.1 TPAH, third bullet: The description of the spatial trend in TPAH 17 concentrations in the sediments in Dutch Kills is not consistent with the data displayed in Figure 4-16b. Except for the first two samples at the confluence with Newtown Creek, the TPAH17 concentrations in the entire length of Dutch Kills are similar, generally ranging from about 20 to 100 milligrams per kilogram (mg/kg). Revise the text to more accurately reflect the data for Dutch Kills presented on Figure 4-16b.

11. Page 157, Section 4.2.3.2 TPCB, second bullet: The text states that the TPCB concentrations in CM 1–2 overlap with the TPCB concentrations in the reference areas. While there is some overlap of TPCB concentrations in CM 1–2, more than half of the TPCB concentrations measured in the CM 1–2 reach are higher than those measured in reference areas. Revise the text to more accurately reflect the comparison of CM 1–2 data with reference area data.

12. Page 158, Section 4.2.3.2 TPCB, third bullet: The description of the spatial trend in TPCB concentrations in the sediments in Dutch Kills is not consistent with the data. With the exception of the first two samples at the confluence of Dutch Kills and the main stem of the Creek, the TPCB concentrations in the entire length of Dutch Kills are similar (see RI figure 4-19b). Revise the text to more accurately reflect the data presented for Dutch Kills on Figure 4-19b.

13. Page 159, Section 4.2.3.3 Cu, sixth bullet: The description of the spatial trend in Cu concentrations in the sediments of Dutch Kills is not consistent with the data. Except for the first two samples at the confluence with the main stem of the creek, the Cu concentrations in the entire length of Dutch Kills are comparable (see draft RI Figure 4-22b). Revise the text to more accurately reflect the Cu data for Dutch Kills.

14. Page 159, Section 4.2.3.3 Cu, seventh bullet: There does not appear to be any spatial trend in Whale Creek. Delete spatial trends in the text or provide the rationale for a spatial trend.

15. Page 159, Section 4.2.3.4.1 – 2,3,7,8-TCDD, first sentence: Delete the text stating that data are shown for the 14 reference areas. 2,3,7,8-TCDD data are available only for the four Phase 2 BERA reference areas, not for the other 10 reference areas.

16. Page 164, Section 4.2.3.4.4 Summary, last paragraph: Point sources are not the only ongoing source of contaminants to the tributaries. Other ongoing sources include groundwater discharge, East River solids, and shoreline seeps. Revise the text to include these other sources.

17. Page 167, Section 4.2.5.1 PAHs, first full paragraph. Sediment data collected by National Grid under the NYSDEC administrative order on consent (AOC) do not have TPAH34 concentrations. Include a note in the text and on Figure 4-34.

18. Page 172, Section 4.3.2.1 Percent Fines: Figure 4-41 shows percent fines data for subsurface sediment (and native material) as longitudinal profiles by CM. Figure 4-42 shows percent fines data for subsurface sediment as box plots by CM. The narrative in this section discusses arithmetic average concentrations as a basis of summarizing conditions. Because the longitudinal profile does not provide any visual representation of averages and because the box plot figure shows medians as the representation of central tendency, the discussion should also include median concentrations as a basis of summarizing conditions. This same comment applies to the narrative description of TOC data in Section 4.3.2.2.

19. Page 173, Section 4.3.2.2 Total Organic Carbon, last sentence: The vertical pattern of OC in the sediments is not necessarily indicative of higher CSO loads in the past, and there is limited data on historical OC levels in historical CSO discharges. Subsurface sediment OC has also been impacted by historical releases and discharges other than CSOs. Revise the text to include a more balanced discussion of the relevant sources contributing to the observed vertical pattern of OC in sediment.

20. Pages 180-181, Section 4.3.4.2 High-Resolution Cores, (URI.203): This comment relates to prior comment URI.203, for which the response is partially acceptable. In response to this prior comment, the NCG included additional detail in the bullets of this section to compare concentrations in shallower sediments to deeper sediments. However, there are additional trends in the data that should be described. In the CM 0–1 cores (NC154, NC161, and NC259), TPAH concentrations generally increase just below the surface, then decrease to 20 to 30 centimeters (cm) in depth, then increase to terminal depth, with the net being higher concentrations at 60 cm compared to the surface. In these same cores, concentrations for TPCB and Cu appear to generally increase with depth. Core NC071 in the CM 2+ region demonstrates a consistent pattern with depth for all contaminants: concentrations increase slightly to roughly 10 cm, then increase more significantly at 20 cm, then decrease to roughly 30 cm, and increase again to the terminal depth. Cores EK006 and EB006 appear to demonstrate a generally increasing concentration trend with depth in addition to having the generally highest concentrations at the terminal depth. For the Whale Creek core (WC012), the highest concentrations of TPCB and Cu are at the terminal depth, which should be noted. Revise the bullets to describe these patterns.

21. Page 182, Section 4.4.2: Percent Fines, Total Organic Carbon, TPH, and Soot Carbon: This section is structured into three subsections that describe percent fines (Section 4.3.2.1), TOC (Section 4.3.2.2), and TOC composition (Section 4.3.2.3). Section 4.3.2.3 specifically describes the relationships between TOC and TPH and between TOC and soot carbon for subsurface sediment. Section 4.4.2 should be structured similarly for consistency for both subsurface sediment and native material characteristics. The narrative in Section 4.4.2 that describes TPH concentrations in native material does not specifically describe the ratio between TPH and TOC (as is described in Section 4.3.2.3 for subsurface sediment) nor does it reference Figure 4-49, which depicts this ratio. Similarly, the narrative in Section 4.4.2 that describes soot carbon concentrations in native material does not specifically describe the ratio between soot carbon and TOC (as is described in Section 4.3.2.3 for subsurface sediment) nor does it reference Figure 4-53, which depicts this ratio. Restructure Section 4.4.2 for consistency with Section 4.3.2 and include the other information as described by this comment.

22. Page 189, Section 4.5.2.3 Total Organic Carbon, second bullet point: This section attributes the higher levels of TOC concentrations observed in sediment traps at upstream locations with the presence of CSOs at the heads of the tributaries. Total rainfall during Quarter (Q)2 was approximately 13 inches as compared to 9 inches in both Q1 and Q3. However, the higher amount of rainfall in Q2 did not result in higher TOC in Q2 sediment trap samples. Discussion should include an assessment of the potential effect of differences in the sediment trap data based on the rainfall amounts during deployment and whether other sources of the OC in the traps (e.g., propwash and point sources other than CSOs) could impact the observed differences in OC concentrations in the Q2 versus Q1 and Q3 traps.

23. Page 196, Section 4.6.1.2 NAPL Dataset, Second full paragraph: The text reads as follows: "Visual observations of potential NAPL presence or absence in sediment and native material were described in the following terms, consistent with the Phase 2 FSAP Volume 2 (Anchor QEA 2014d) and NYSDEC guidance (NYSDEC 2012a):" Revise this sentence and elsewhere in the RI Report to reference the Phase 2 FSAP Volume 2 only and not the NYSDEC guidance.

24. Page 206, Section 4.6.4 Native Material, first paragraph, third sentence: The text reads as follows: "Surrounding cores that penetrated to similar depths contained no visual evidence of potential NAPL, indicating that the deep native material impacts in the Turning Basin are localized and discontinuous." Based on the cross section in Figures C5-16c, the surrounding cores are not as deep except for one other core. Revise this text to provide clarification.

25. Pages 209-211, Section 4.7.2.1 Salinity, second paragraph: Salinity measurements during dry and wet weather sampling events are described, with Figure 4-103 referenced. For the dry weather salinity measurements, it appears that median salinity levels were slightly lower for Maspeth Creek, East Branch, and English Kills. In addition, Round 1 wet weather salinity are described as generally lower compared to Round 2, when median salinities were at least marginally higher during Round 1 in all reaches except CM 0–1. In

the final paragraph, salinity measurements are described with respect to tidal cycles, with Figures 4-106a and 4-106b referenced. Similar to Figure 4-103, Figures 4-104 (shallow samples), 4-106a, and 4-106b appear to show marginally lower salinities for some of the upcreek tributaries, and Figure 4-106b appears to show marginally higher salinities at higher tides for all reaches. Revise this section to more clearly describe the patterns that are observed in the graphics and discuss the implications of these patterns and results.

26. Page 213, Section 4.7.2.3: TSS (URI.230): This comment relates to prior comment URI.230, for which the response is not acceptable. From Figures 4-111 and 4-112, the concentrations of total suspended solids (TSS) in Round 1 wet weather samples are generally not dramatically different from the concentrations in dry weather samples. The concentrations measured in Round 1 wet weather samples are likely influenced by both solids loading from point discharges and dilution from increased water inflow. Revise this section to clarify the conclusion. The NCG also included language in the current draft of the RI indicating that comparisons between wet and dry weather TSS data could be confounded because the samples were not collected at the same time of year. Clarify how this is unique to TSS data, and this same issue should not be noted for any other comparison between dry and wet weather data.

27. Pages 214-215, Section 4.7.3.1.1 Spatial Distribution: Figure 4-114 demonstrates dry weather TPAH data for surface water as box plots by CM. The narrative in this section discusses arithmetic average concentrations as a basis of summarizing conditions. Because the box plots show medians as the representation of central tendency, the discussion should also include median concentrations as a basis of summarizing conditions. This same comment applies to the narrative description of dry weather TPCB surface water data in Section 4.7.3.2.1 (Figure 4-118) and dry weather Cu surface water data in Section 4.7.3.3.1 (Figure 4-123).

28. Page 214, Section 4.7.3.1.1 Spatial Distribution: Figure 4-114 demonstrates an overall pattern of increasing dry weather TPAH concentrations in surface water with increasing CM. Describe this overall trend in the text in addition to the trends by more discrete CM reaches and individual tributaries.

29. Page 215, Section 4.7.3.1.2: Variations with Depth, Time, and Tidal Cycle, first paragraph of the section: The text indicates that Figure 4-115 demonstrates no apparent systematic difference between surface and deep samples in the tributaries, "with the exception of a subset of sample data that have concentrations greater than 0.5 μg/L in the deep sample." Explain how it is possible to parse this from the Figure 4-115 cross plot, which demonstrates a single statistical test across all of the plotted data. Revise the text accordingly or remove this statement.

30. Page 216, Section 4.7.3.2.1 Spatial Distribution: Figure 4-118 demonstrates an overall pattern of increasing dry weather TPCB concentrations in surface water with increasing CM. Describe this overall trend in the text in addition to the trends by more discrete CM reaches and individual tributaries.

31. Pages 217-218, Section 4.7.3.2.1 Spatial Distribution, bullets for English Kills, East Branch, Maspeth Creek, and Dutch Kills: These bullets do not provide any comparison to reference data for TPCB concentrations. Include this comparison explicitly in the narrative.

32. Page 218, Section 4.7.3.2.2 Variations with Depth, Time, and Tidal Cycle, first paragraph: The text describes Figure 4-120 and suggests that the reference areas show similar TPCB concentrations in shallow and deep samples based on the figure. The reference areas pane of Figure 4-120 shows a p-value of 0.020, which, according to the description of the binomial test statistic, should indicate that the data distribution is significantly above or below the 1:1 line. Explain the meaning of the p-value in the context of the conclusion offered and the visual appearance of the reference area data in the cross plot.

33. Page 219, Section 4.7.3.2.2 Variations with Depth, Time, and Tidal Cycle, final paragraph of this section: The text states that there are no clear relationships between dry weather surface water TPCB concentrations and tide direction (Figure 4-122a) or tidal stage (Figure 4-122b). Both figures appear to show a generally increasing concentration pattern with increasing CM, similar to Figure 4-118 (see comment on Section 4.7.3.2.1 above). Acknowledge this overall trend in the text.

34. Page 220, Section 4.7.3.3.2 Variations with Depth, Time, and Tidal Cycle, first paragraph: The text describes Figure 4-124, a cross plot of surface water Cu data by depth. For the main stem, the text states that "the majority of the data do not show a systematic difference with sampling depth." Explain how it is possible to parse this from the Figure 4-124 cross plot, which demonstrates a single statistical test across all of the plotted data and provides a p-value of 0.026 for the main stem. Revise the text accordingly or remove this statement. In addition, this paragraph indicates that "Cu concentrations are not dependent on depth in the tributaries and reference areas." However, a p-value could not be calculated for Cu in surface water for the reference areas. Explain how Figure 4-124 demonstrates this lack of relationship for the reference areas or modify the text accordingly.

35. Pages 221-222, Section 4.7.4.1.1: Spatial Distribution: Figure 4-127 demonstrates wet (and dry) weather TPAH data for surface water as box plots by CM. The narrative in this section discusses arithmetic average concentrations as a basis of summarizing conditions. Because the box plots show medians as the representation of central tendency, the discussion should also include median concentrations as a basis of summarizing conditions. This same comment applies to the narrative description of wet weather TPCB surface water data in Section 4.7.4.2.1 (Figure 4-129) and dry weather Cu surface water data in Section 4.7.4.3.1 (Figure 4-131).

36. Page 224, Section 4.7.4.2.2 Comparison Between Round 1 and Round 2 Sampling: Reverse the order of the final two sentences in this section to avoid confusion (i.e., as written, the final sentence is dislocated from the sentence that it modifies).

37. Page 227, Section 4.7.5 Particulate Phase Concentrations, second to last paragraph: This paragraph states that particulate phase concentrations in the Study Area are typically

higher than in the reference areas during both dry and wet weather conditions. Update the text to explicitly describe that the magnitude by which Study Area particulate phase concentrations are higher than reference areas is greater during wet weather conditions as compared to dry weather conditions.

38. Page 228, Section 4.8.1 Porewater Dataset, second full paragraph, last sentence: As this is the first use of the term, clarify what is meant by “mid-depth” as it relates to the sediments and underlying native materials.

39. Page 229, Section 4.8.1 Porewater Dataset, first paragraph, last sentence: Note where in the RI the reader can find the deployment durations for the in situ passive samplers.

40. Page 234, Section 4.8.2.2.3 Cu Spatial Distribution, first paragraph, fourth sentence: Revise the text to read as follows: “Cu concentrations are non-detect in several samples and are relatively variable within the Study Area, potentially due in part to the differing sampling methods employed.”

41. Section 4.9: The text should be revised to state that the attenuation and magnitude of Study Area impacts from groundwater-borne COPCs are explicitly modeled in the – model and this will be investigated as part of the CF&T modeling. Results of the CF&T modeling will be discussed with EPA to determine whether they will be incorporated into the final RI report or presented in the FS.

42. Page 241. Section 4.9.1, second to last sentence: Remove the statement, “This was unavoidable due to the well construction and sampling methods that were used in accordance with the EPA Final Groundwater Investigation Work Plan (EPA 2014a).” Statement is extraneous and unnecessary.

Section 5 Sources

Specific Comments

1. Page 269, Section 5.1.2 Flow Data, CSO and stormwater, first paragraph: The arithmetic average annual CSO discharge provided by the NCG includes precipitation data for 2011, which was an unusually wet year. For the CF&T modeling, 2008 is proposed as the standard rainfall year, which is similar to the input used in the approved long-term control plan (LTCP). Provide annual discharge for 2008 or a range from 2008 to 2012.

2. Page 269, Section 5.1.2 Flow Data: Include the annual discharge from treated effluent from groundwater remediation and dewatering systems in this section of the text.

3. Page 297, Section 5.2.1, top of page 297, and Section 8.6.1.3, top of page 492: Compare the negative seepage rates estimated at CM 1.1, between CM 1.2 and 2.0, and at CM 0.5 to salinity profile data if available at those locations. Discuss if the salinity profile at one or both locations is consistent with the negative seepage rates, or if it indicates a significant presence of fresh groundwater. Discuss the salinity profile data in the text as a relevant factor for evaluating seepage direction into the Study Area.

4. Page 302, Section 5.2.3 Sensitivity Analysis, final bullet: See Section 4, General Comment No. 2.

5. Page 303, Section 5.3 East River, first paragraph, last sentence: This sentence seems inconsistent with the presentation of information in Tables 5-18 to 5-25, which present data from the transect at the mouth separated by flood and ebb. Revise the text to be consistent with the tables.

6. Page 304-308, Section 5.3.1 to 5.3.5, and Figures 5-30 to 5-37: Given that Tables 5-18 to 5-25 break out the transect data into flood and ebb, clarify if the data presented in the figures include all transect data, or only flood, or only ebb. If the figures include only flood or ebb tide data, revise the figures to include both sets of data.

7. Page 305, Section 5.3.2 TSS: Data quality issues with the grain size data collected under the June 2018 East River sampling program should be discussed in the data usability appendix.

8. Page 309, Section 5.4 Shoreline Erosion, second paragraph: This paragraph indicates that the initial evaluation of shoreline erosion was based primarily on observations of bank conditions. However, the prior draft of the RI report indicated that the initial evaluation was also based on the review of available documentation (e.g., Sanborn maps and spill records). Revise the text to indicate that the initial evaluation was based on the review of available documentation and observations of bank conditions.

9. Page 309, Section 5.4 Shoreline Erosion, last sentence on the page: This sentence indicates that material within the shoreline area is likely to represent native soils, fill associated with reworking the shoreline by adjacent site owners or occupants, and material

deposited from other sources. Update this language to reflect that the shoreline area likely contains various other fill materials, consistent with other portions of the RI report, including materials likely derived from outside the Study Area.

10. Page 309, Section 5.4 Shoreline Erosion, last sentence: Delete the example listed in the sentence. While the sediments adjacent to the CSO outfall may have originated from the CSOs, there are other sources of COPCs to those sediments, including groundwater, the East River, and other point sources.

11. Pages 311-312, Section 5.4.2.1 Surface TPAH: An overall pattern of increasing TPAH concentrations in the upcreek direction is evident in Figure 5-40. Update the text to reflect this overall pattern. For the bullets that describe the data from CM 1–2 and Dutch Kills, the text indicates that the shoreline concentrations are "consistent with, or lower than, other surface sediment data" or "fall within the range of, or lower than, other surface sediment data." However, for both bins of data, there is only one result lower than the other data. Revise the text to reflect that surface TPAH concentrations in the shoreline area for CM 1–2 and Dutch Kills are consistent with other data, with the exception of one result each.

12. Pages 312-314, Section 5.4.2.2 Surface TPCB: An overall pattern of increasing TPCB concentrations in the upcreek direction is evident in Figure 5-41. Revise the text to reflect this overall pattern.

13. Pages 314-315, Section 5.4.2.3 Surface Cu:

    a. An overall pattern of increasing Cu concentrations in the upcreek direction is evident in Figure 5-42. Revise the text to reflect this overall pattern.

    b. First bullet, CM 0–1: The text indicates that the one result is lower than the median concentration of other surface sediment data. Update the text to indicate that this one result is within the overall distribution of the other surface sediment data from CM 0–1.

    c. Fourth bullet, East Branch: The text indicates that the shoreline surface sediment data are consistent with, or lower than, other surface sediment data, when, the shoreline data appear consistent with or higher than the other surface water data. Revise the text to reflect accordingly.

    d. Sixth and seventh bullets: The text indicates that the shoreline data are generally consistent with, or lower than, the other surface sediment data, when in fact the shoreline data populations have results that are both lower than and higher than the other sediment data (and for Maspeth Creek, the average Cu concentration for the shoreline data is higher than the maximum result for the other data). Update the text accordingly.

    e. Last paragraph: The text indicates that "shoreline surface sediment Cu concentrations are generally similar to, or lower than, the rest of the RI surface sediments…" and that "…elevated Cu concentrations exist in English Kills and Maspeth Creek." Update the text to more accurately indicate that surface sediment Cu concentrations in the shoreline area are generally consistent with but show both higher and lower concentrations compared to other RI data and to indicate that localized elevated Cu concentrations are present in the shoreline surface sediments.

14. Pages 315-316, Section 5.4.3.1 Subsurface TPAH: The text indicates that "generally, shoreline subsurface sediment TPAH concentrations are similar to, or lower than, the surface sediments collected at the same sample location." Figure 5-43 demonstrates that more than half of the cores (13 of 24) have higher concentrations in the subsurface. Update the text to more accurately reflect the comparison between surface and subsurface concentrations.

15. Page 316, Section 5.4.3.2 Subsurface TPCB: This section indicates that "generally, shoreline subsurface sediment TPCB concentrations are similar to, or lower than, the surface sediments collected at the same sample location." Figure 5-44 demonstrates that nearly half of the cores (10 of 24) have higher concentrations in the subsurface. The text also indicates that elevated TPCB concentrations are present at depth in cores NC386, DK066, EK131, and EK133, whereas Figure 5-44 shows these cores have higher concentrations at the surface (NC386, DK066, and EK131) or have only marginal difference between surface and subsurface concentration (EK133). Update the text to more accurately reflect the comparison between surface and subsurface concentrations.

16. Page 316, Section 5.4.3.3 Subsurface Cu: The text in this section indicates that "generally, shoreline subsurface sediment Cu concentrations are similar to, or lower than, the surface sediments collected at the same sample location." In fact, Figure 5-45 demonstrates that more than half of the cores (17 of 24) have higher concentrations in the subsurface. Update the text to more accurately reflect the comparison between surface and subsurface concentrations.

17. Page 317, Section 5.4.4 Shoreline Erosion Summary: There are several statements in this section that are not accurate based on the data presented.

    a. First paragraph, first sentence: It states that, with a few exceptions, contaminant concentrations in surface sediments in shoreline areas are consistent with or less than surface sediment concentrations in other (non-shoreline) areas of Newtown Creek. This statement is inaccurate; rewrite this to indicate that the surface sediment contaminant concentrations in the shoreline areas generally show an increasing trend in the upcreek direction, consistent with overall patterns in the other RI data.

    b. Fourth paragraph, first sentence: This sentence suggests that subsurface sediment contaminant concentrations in the shoreline areas are generally similar to or lower than the surface sediment concentrations in the same areas. This is not substantiated by the data presented, which show nearly to well over half of the 24 shoreline cores have higher contaminant concentrations in the subsurface. Revise this paragraph to accurately represent the data (see previous comments on Sections 5.4.3.1, 5.4.3.2, and 5.4.3.3, respectively, above).

Section 6 Fate and Transport

Specific Comments

1. Page 328, Section 6.1 Introduction, Figure 6.1: Add a horizontal arrow representing "External Loads (groundwater flux)" to the surface sediment layer. Revise the text on page 329 (first paragraph) to acknowledge this external load.

2. Page 329, Section 6.1 Introduction, second paragraph, third sentence: Modify the text (e.g., via footnote) to note that this gradient could also potentially be impacted by other factors (e.g., horizontal loadings).

3. Page 332, Section 6.2.2 Current Velocities, Circulation, and Tidal Effects: First sentence in paragraph refers to "more saline water flowing inland in a bottom layer during incoming tide." Such density-driven or estuarine circulation is generated by along-channel salinity gradients, is independent of the tide, and persists even during ebb tide. Delete the phrase "during incoming tide."

4. Page 334, Section 6.3.1, Sediment Bed Characteristics: Revise the text to note that, while net depositional as a whole, erosional areas (be they episodic or longer term) exist at the site.

5. Page 333-334, Section 6.3 Sediment Transport, second sub-bullet for the bullet starting on page 333 and the bullet starting on page 334: Both sub-bullets attribute long-term temporal (50 to 75 years) changes in NSRs only to changes in point source loadings. However, the analysis in Attachment G-G also attributes changes in NSRs over this time period to changes in trapping efficiency. Revise the sub-bullets to also mention changes in trapping efficiency as a cause for changing NSRs, consistent with the analysis in Attachment G-G.

6. Page 335, Section 6.3.2 Sediment Sources and Inputs, last sentence in first complete paragraph: Rather than characterizing washload as "having effectively a zero settling speed", recommend rewording as "subject to negligible deposition" since that is a more accurate description of the process in reality and in the model.

7. Page 335, Section 6.3.2 Sediment Sources and Inputs, full paragraph: The dry weather TSS values show minimal, if any, gradient during dry weather. Revise the text to state that there is no or a minimal spatial gradient in TSS during dry weather for the entire creek, not just from the East River to Turning Basin.

8. Page 338, Section 6.3.4 Deposition and Net Sedimentation, second paragraph: The text should be edited to show the range of East River solids deposition in English Kills and East Branch. As per Figure G5-160, the East River deposition in the lower portions of English Kills and East Branch is as high as 40 to 60%.

9. Page 338, Section 6.3.4 Deposition and Net Sedimentation, first sentence on page: The lines of evidence referenced in the text presumably refer to the analysis in Attachment G-

H. As commented in the context of Attachment G-H, in addition to changes in CSO loads, changes in trapping efficiency also may have affected NSRs over time. Revise the text to mention the effect of this transport process on NSRs.

10. Page 340, Section 6.4.1, Chemical Partitioning Characteristics, first bullet: Revise the bullet as follows: "PAHs, PCBs, and Cu partition onto the solid phase in a manner that can be estimated using an equilibrium partition coefficient. However, for the Newtown Creek RI, this partitioning is not currently being represented through traditional OC-based approaches for the organics, due to complexities of sources and forms of OC present in the Study Area."

11. Page 342, Section 6.4.1.3.1 Datasets and Analysis Approach, second and third bullets: Revise the text to note what degree of chemical equilibrium between the aqueous and solid phases in the point sources and surface water was assumed when determining the referenced partitioning coefficients and the supporting rationale for that assumption.

12. Pages 339 Section 6.4.1 Chemical Partitioning Characteristics: Further discussion and rationale are needed in the text for the selection of non-traditional solids-based (K_d) chemical phase partitioning instead of OC-based (K_{oc}) chemical phase partitioning. The standard error results reported for the averages of the log ratios of paired surface sediment and shallow porewater concentration measurements shown on Figures 6-8a to 6-8f are generally similar, whether K_d or K_{oc}. Standard error results for naphthalene are identical for both phase partitioning approaches and therefore are not a factor in approach selection. Standard error results are somewhat smaller on a particulate organic carbon (POC) basis for C3-naphthalenes, tetra-CB, penta-CB, hexa-CB, and hepta-CB, and slightly favor the traditional POC-based phase partitioning approach. The solids-based partitioning approach has slightly lower standard error results for fluoranthene, pyrene, benzo(a)pyrene, di-CB, and tri-CB, slightly favoring solids-based partitioning. Standard error results for 5 of 11 of the non-metal chemicals to be modeled per the analysis presented in the RI for the bed therefore slightly favor either OC-based or dry weight-based chemical phase partitioning (i.e., a 5-chemical to 5-chemical tie between evaluating the two approaches in terms of smaller standard error):

    a. Page 344, second bullet: This should state that standard error result based on site measurements were non-decisive, and the text should be revised to state that the standard error results for the site surface bed measurements (down to 30 cm) were non-decisive for approach selection.

    b. The statement that K_d relationships are in many cases better than K_{oc} relationships should be removed given that each is better for five of the non-metal chemicals to be modeled.

    c. The statement that an improved relationship on a K_d basis is observed for porewater PAHs ignores the stronger K_{oc} results for naphthalene and C3-naphthalenes and should either be removed or qualified with the specific PAHs to be modeled for which the statement is true. Further, the discussion of porewater PAHs should also reflect that neither partitioning approach, regardless of slight differences in the reported standard error results being used for comparing the approaches, captures the outlier Triad program measurements in English Kills and CM2+ most notably for benzo(a)pyrene (Figure 6-8f) and to a lesser extent for pyrene (Figure 6-8e) and fluoranthene (Figure 6- 8d).

d. Page 349, Section 6.4.1.3.4: Similarly, the statement that OC does not reduce variability in the partitioning relationships in the Study Area (due to dry weight relationships being stronger than OC-based relationships) is incorrect and should be limited to specific chemicals or deleted.

e. While the standard error results address variability in the measurements as compared to the y-intercept, the standard error results do not address how closely the measurements fit the imposed slope of 1 and the overall equation. For this reason, a coefficient of determination (R2) value, the ratio of the variation explained by the regression line and the total variation, should also be provided on Figures 6-8a to 6-8f as requested in comments on the previous draft of the RI. Further, it is typical to include a coefficient of determination result when a regression analysis is used.

13. Page 353, Section 6.4.2.1 Dry Weather, second paragraph, first sentence: English Kills is the only tributary where TPCB concentrations are significantly higher than in the rest of the creek. For other COPCs, including TPAH17, there are no significant differences in the whole water concentrations measured in surface water during dry weather conditions. Revise the text to state that TPCB concentrations in English Kills are higher than in the rest of the creek. Delete the association with porewater and sediments from the tributaries as the concentrations in tributaries in dry weather are similar to the main stem with the exception of TPCB concentrations in English Kills.

14. Page 355, Section 6.4.2.2 Wet Weather, second paragraph, "Similar to TPAH concentrations, TPCB and Cu concentrations in surface water do not show much of a relationship with rainfall duration and intensity (see Figures 6-21 and 6-22, respectively). In contrast to TPAH, the TPCB concentrations in English Kills were lowest in Event 1 (the highest total precipitation event). This could indicate a potential dilution effect where relatively lower TPCB concentrations were associated with stormwater-derived point source inputs in that reach during this event, resulting in lower surface water concentrations. This dilution effect could have been observed for TPCB (but not TPAH) due to differences in concentration and runoff behavior of the individual sewersheds contributing these chemicals to the point source discharges in this tributary. However, the data are too limited to draw definitive conclusions." Delete the last portion of the text regarding dilution effect observed for TPCB (but not TPAH) as it is speculative.

15. Page 356, Section 6.4.2.2 Wet Weather, first paragraph, last sentence, "This difference would suggest that concentrations in the East River during these wet weather events were not higher than those under dry weather, which could be due to the large dilution in the East River or timing of discharges to that waterbody relative to those in the Study Area." Explain how this assertion can be made when wet weather surface water data were not collected in the East River.

16. Page 356, Section 6.4.2.2 Wet Weather, second paragraph, "Furthermore, tidal exchange with the East River is the dominant mechanism controlling surface water chemical concentrations in the main stem of Newtown Creek and the lower tributaries under dry weather conditions. This process resulted in lower concentrations in CM 0 – 1 relative to the upper portion of the Study Area during wet weather sampling but was not the mechanism causing the increase in surface water concentrations observed during wet weather conditions elsewhere." The East River is the dominant source to the creek during dry weather conditions as supported by sampling results. The second sentence is confusing and needs to be clarified or deleted.

17. Page 357, Section 6.4.3.1 Processes that Influence Surface Porewater Concentrations, first paragraph, first sentence: The text reads as follows: "The concentrations and spatial patterns of surface porewater data (0 to 15 cm [0 to 6 inches]) are presented in Section 4.8.2." Clarify why the 15 to 30 cm data are not referenced here as well.

18. Page 359, Section 6.4.3.1.2 Effects of Tidal Exchange and Advection on Surface Porewater, last paragraph: The draft RI indicates that the results of the TRIAD data are similar to the porewater data collected as part of the groundwater program. Comparison of the paired data shows that for all paired data, the COPC concentrations measured as part of the TRIAD program are higher than those measured as part of groundwater program. Differences in the paired data must be discussed in the context of the sample collection methodologies used for the TRIAD samples (ex situ) and the groundwater samples (in situ) and the potential effects of tidal pumping on the sample results.

19. Page 360, Section 6.4.3.1.2 Effectives of Tidal Exchange and Advection on Surface Porewater, "Second, concentration gradients between surface water and shallow porewater provide further evidence that tidal exchange is not a dominant process affecting the in situ porewater samples…… the cause for this similarity must be due to mechanisms other than tidal exchange (i.e., strong partitioning within surface sediments; see Section 6.4.1.3)." The assertion that tidal exchange (tidal pumping) is not responsible for the observed gradient between surface water and shallow porewater is not supported. The observed gradient could also be the result of tidal pumping diluting shallow porewater, resulting in a gradient with porewater concentrations being less than groundwater but greater than surface water. The text needs to provide further discussion and explanation of why tidal pumping is not a plausible explanation of the observed gradient and why it must be due to other mechanisms (i.e., strong partitioning in surface sediments).

20. Page 367, Section 6.4.3.3 Particulate Phase Sediment/Water Exchange, second to last paragraph: The sediment trap data do not have lower concentrations of PAHs as compared to nearby sediment. Evaluation of the data shows that in upper tributaries, the sediment trap data are comparable to data in the nearby sediments. For CM 1.5+ and Maspeth Creek, East Branch, and English Kills, naphthalene concentrations in sediment traps are comparable to the concentrations in the sediments. In portions of the creek, such as Dutch Kills, the naphthalene concentrations in the traps are lower than those in

nearby sediments. Also, for TPCB and Cu, the concentrations in the sediment traps are comparable in English Kills. Revise the text to more accurately reflect the data.

21. Page 367, Section 6.4.3.3 Particulate Phase Sediment/Water Exchange, and footnote 190: The text asserts that gas ebullition cannot be a source of COPCs measured in sediment traps. The COPC concentrations measured in the sediment traps are higher than those measured in East River solids and point source solids. Because contaminant concentrations in the traps are not higher than neighboring sediments or deeper sediments does not preclude the influence of contaminants from other sources on the traps. Revise the text and footnote 190 to acknowledge other potential sources of contaminants to the sediment traps such as ebullition and sediment resuspension.

22. Page 368, Section 6.4.3.3 Particulate Phase Sediment/Water Exchange, second paragraph, "The elevated TPCB concentrations observed in the Q2 samples from one location each in Dutch Kills and Maspeth Creek may also be indicative of variations in point source loads at these locations." The draft RI states that the two elevated TPCB concentrations in the Q2 samples may be from point source discharges; however, this is not supported by the point source data as concentrations of TPCB observed in the two trap samples (27 and 28 mg/kg) are an order of magnitude higher than those in CSO solids (maximum 1.4 mg/kg) and MS4 (max 1.8 mg/kg). Provide the relevant data to support the statement that elevated TPCB concentrations in the Q2 samples could be the result of variations in point source loads in Dutch Kills and Maspeth Creek or delete the text referenced above.

23. Page 369, Section 6.4.4 Surface Sediment Chemical Fate and Transport Processes, first paragraph, fifth sentence: Revise the text to note that areas of erosion and episodic erosion/deposition have been identified at the site.

24. Page 370, Section 6.4.4.2, Sources of Chemicals to the Surface Sediment, first partial paragraph, first full sentence: Revise the text as follows: "As such, porewater advection is relatively more significant as a source of chemicals to the surface sediment in areas with lower relative NSRs and higher seepage rates primarily for less sorptive contaminants (e.g., LPAHs)."

25. Page 373, Section 6.4.4.4 Physical Mixing in the Surface Sediment, first full paragraph, first sentence: Revise the text to discuss empirical evidence of bioturbator distribution within the site.

26. Page 373, Section 6.4.4.4, Physical Mixing in the Surface Sediment, last paragraph, last sentence: Revise the text to note why only lead-210 (Pb-210) geochronology data are being used to examine mixing as opposed to using both Pb-210 and cesium-137 (Cs-137) data.

27. Page 374, Section 6.4.4.5 Changes in Surface Sediment Concentration over Time, second full paragraph, first sentence: Revise the text to note that not all cores (~80% are showing recovery based on Section 6.4.4.5) show that sediment concentrations are declining over time.

28. Page 374, Section 6.4.4.5, Changes in Surface Sediment Concentration over Time, first paragraph, third sentence: Revise the text as follows: "Near-surface concentration gradients are caused by deposition of solids with considerably lower *(or higher)* chemical concentrations than present in the sediment bed; gradients are more limited if depositing solids have concentrations that are similar to those present in the sediment bed or if mixing is rapid enough to eliminate the gradient." *Emphasis* added for comment clarity.

29. Page 374, Section 6.4.4.5 Changes in Surface Sediment Concentration over Time, third paragraph, first sentence: Revise the text as follows: "Overall, the roles of net sedimentation, sources, loss processes, and mixing have likely combine*d* to produce reductions in surface sediment concentration over time (as compared to historical concentrations) throughout much of the Study Area, as evidenced by the sediment core data."

30. Page 378, Section 6.4.5.2 Losses of Chemicals from the Subsurface Sediment: It is premature to conclude that groundwater-borne COPC loadings have a negligible impact on the Study Area. FS-stage CF&T modeling and analysis must be conducted before making such a conclusion. The assumptions and analysis approaches supporting this RI conclusion need to be reevaluated during the FS CF&T modeling efforts, which should include interaction with EPA for discussing and agreeing to the conceptual basis elements, the adjustments to assumed values, and the sensitivity analysis thresholds needed. Results of the CF&T modeling will be discussed with EPA to determine whether they will be incorporated into the final RI report or presented in the FS. This comment also applies to Section 8.5.2.3, Section 8.6.1.3, and Section 9.1 pages 512-513.

31. Page, 338, Section 6.4.7.2 Fate and Transport, 3rd Bullet: Replace "NAPL/water density contrast" with "NAPL specific gravity, if appropriate."

32. Page 389, Section 6.4.7.2 NAPL Advection in Sediment and Native Material, NAPL emplacement bullet: Briefly describe how this impacts the ability of NAPL to flow as a separate phase.

33. Page 390, Section 6.4.7.2 NAPL Advection in Sediment and Native Material, second paragraph: Revise this paragraph to include a brief summary of the results from the initial screening stage.

34. Page 390, Section 6.4.7.2 NAPL Advection in Sediment and Native Material, footnote 205: The text reads as follows: "For NAPL with a density of 1, a 1-G centrifuge spin creates a hydraulic gradient of 1." Provide a citation for this statement. Also include a discussion of uncertainties due to potential variations in NAPL density.

35. Page 391, Section 6.4.7.2 NAPL Advection in Sediment and Native Material, first paragraph, last sentence: Clarify what is meant by "measurable greater amounts" in quantitative terms.

36. Page 392, Section 6.4.7.5 NAPL Migration Associated with Gas Ebullition, last paragraph, last sentence: The text reads as follows: "These FESs were performed during the time of

year when gas ebullition is expected to be most active…" Revise the text to include what time of year the field ebullition surveys (FESs) were performed.

37. Page 394, Section 6.4.7.5 NAPL Associated with Gas Ebullition, fourth bullet: Delete the fourth bullet. The association of static sheens with point source discharges is speculation.

38. Page 396, Section 6.5, Mass Load and Inventory Comparisons: Revise this section to also note that preliminary mass estimates will be refined during the FS and associated CF&T modeling.

39. Page 406, Section 6.6 Bioaccumulation, footnote 216 (URI.319 and URI.323): Footnote 216 discusses why the RI focuses on PCBs and why total dioxins/furans, while bioaccumulative and primary contributors to both cancer risk and noncancer hazards, are not part of the RI discussion. Revise this RI section in accordance with RI General Comment No. 1.

40. Page 409, Section 6.6.2.1 Resident Organisms, footnote 217 (URI.327): Delete the sentence, "This is particularly evident in the mobile species in Newtown Creek, where the tissue PCB concentrations are not fully explained by the Study Area sediments, rather the PCBs represent a mix of exposure sources, consistent with these species' life history and diet."

Section 7 Risk Assessment Summary

Specific Comments

1. Pages 424 through 425, Section 7.1.4 Risk Characterization (URI.346, URI.347, URI.348, and URI.349): Text, and not just tables in the risk characterization section should give an indication of the magnitude of estimated risks/hazards that exceed thresholds. It is not adequate to just state that risks or hazards exceeded thresholds. While the text in this section was edited in response to specific edits provided by EPA in the previous comments referenced above, no additional edits were made in response to the general comment (URI.346). Edit the three other paragraphs, noting risks and/or hazards that exceed thresholds to include those values as follows:

   a. Page 424 second paragraph after bullets, second sentence: Add to the end of the sentence "(i.e., cancer risks up to 3×10^{-4})."

   b. Page 424, second paragraph after bullets, third sentence: Add to the end of the sentence "(i.e., noncancer HIs up to 20)."

   c. Page 425, first full paragraph, second sentence: Add to the end of the sentence "(i.e., cancer risks up to 3×10^{-4})."

   d. Page 425, first full paragraph, third sentence: Add to the end of the sentence "(i.e., noncancer HIs up to 20)."

   e. Page 425, second full paragraph, second sentence: Add to the end of the sentence "(i.e., cancer risks up to 8×10^{-4})."

   f. Page 425, second full paragraph, third sentence: Add to the end of the sentence "(i.e., noncancer HIs up to 40)."

Section 8 Conceptual Site Model

Specific Comments

1. Page 463, Section 8.1 Introduction, first full paragraph: The text reads as follows: "For example, pollutants and contaminants that act as non-COPEC stressors, including low DO, porewater sulfide and bulk sediment concentrations of complex hydrocarbon mixtures, may contribute to the adverse effects observed in sediment toxicity tests in some tributary areas influenced by ongoing CSO and MS4 discharges where these stressors are elevated, but where porewater concentrations of COPECs are below risk thresholds. To the extent that discharges of these non-COPEC stressors will continue under any selected remedy, consistent with the urban environment surrounding the Study Area, any adverse effects that may arise from these stressors will need to be taken into account when evaluating the progress of natural recovery and/or recontamination as part of assessing remedy effectiveness " Revise the text to remove the reference to CSO and MS4s. The listed stressors cannot be attributed solely to CSO and MS4s. Delete the second sentence beginning with "To the extent…" Revise the text as follows: "For example, pollutants and contaminants that act as non-COPEC stressors, including low DO, porewater sulfide, and bulk sediment concentrations of complex hydrocarbon mixtures, may contribute to the adverse effects observed in sediment toxicity tests in some tributary areas where these stressors are elevated, but where porewater concentrations of COPECs are below risk thresholds."

2. Page 465, Section 8.2 Site Setting, first full paragraph, and Page 466 Section 8.3 Physical Characteristics of the Study Area, last paragraph, third sentence: Stresses from pollutants and contaminants should be deleted, here and throughout the report. For consistency with the BERA, the discussion of non-COPC stressors should be limited to low DO, sulfide, and complex hydrocarbons.

3. Page 465, Section 8.2 Site Setting, first full paragraph, second sentence: The text reads as follows: "Those potential risks that arise from ongoing urban sources directly impacting the creek, together with regional background concentrations, must influence future remedial decision-making." Remove this sentence as the purpose of the RI is to discuss nature and extent of contamination, not remedial decision-making.

4. Page 469, Section 8.4.1 Surface and Subsurface Sediment, footnote 223: The footnote includes TPAH, TPCB, and Cu, which are correct drivers for the ecological risk assessment. However, the human health risk assessment was driven by PCBs in fish and PCBs and tetrachlorodibenzo-p-dioxin (TCDD) in crabs. The footnote should be revised to include TCDD as a primary risk driver for human health consumption of crabs. A figure should also be added to show the patterns of dioxin in sediment, and dioxins should be included in the discussion in Section 8.4 (see General Comment No. 1).

5. Pages 469-470, Section 8.4.1.1: TPAH, TPCB, and Cu: In addition to describing contamination patterns for discrete CM reaches for surface sediments (which the RI text indicates also describe patterns in subsurface sediments), describe in this section that

there is an overall pattern of increasing contaminant concentrations in the upcreek direction for both surface and subsurface sediments. This section also lacks any information describing patterns between shoreline and non-shoreline areas as are discussed in Section 5.4 of the RI report. This is an important consideration in the overall nature and extent of sediment contamination, and there are locations where the highest contaminant concentrations are observed in shoreline sediments (for both surface and subsurface sediments). Add a brief summary of this information to the narrative and direct the reader to the appropriate sections where it is discussed in detail.

6. Page 470, Section 8.4.1.1: TPAH, TPCB, and Cu: This section summarizes patterns in contaminant concentrations for surface sediments and indicates that subsurface sediment contaminant concentration patterns are generally similar (while not explicitly describing the patterns for subsurface sediments). While it is generally true that subsurface contaminant patterns are similar to surface, there are conclusions offered for surface sediments that are not entirely accurate with respect to subsurface sediments.

    a. CM 0–2 bullet: The narrative indicates that surface sediment concentrations are generally consistent with reference concentrations for both CM 0–1 and CM 1–2. However, Figures 8-9, 8-10, and 8-11 demonstrate that the concentrations in surface sediments for CM 0–1 and CM 1–2 (more so CM 1–2) are actually generally higher than reference areas even if there is overlap between the data distributions in some cases. Revise the text to reflect this.

    b. Tributaries bullet: The bullet that describes patterns in the tributaries provides general patterns for only surface sediments, which are not entirely consistent with subsurface sediments. For instance, high subsurface sediment concentrations are observed for other chemicals beyond TPCBs in Dutch Kills and English Kills (e.g., Cu concentrations in Dutch Kills) and also in other tributaries (e.g., Cu concentrations in Whale Creek). Revise the text to more explicitly describe patterns for subsurface sediments where those patterns are not adequately represented by conditions in surface sediments.

7. Page 472, Section 8.4.1.2, NAPL, bulleted items: Clarify if "…sheen was observed at…locations" (e.g., first sub-bullet for both CM 0–2 and CM 2+) refers to observations of the water surface in the field or observations from the laboratory.

8. Page 474, Section 8.4.2.1 TPAH, TPCB, and Cu: Revise the CM 2+ bullet to also acknowledge the elevated Cu concentration (14,000 mg/kg), as summarized in Section 4.4.3.3, and revise the tributary bullet to acknowledge that at least somewhat elevated concentrations of TPAH, TPCB, and Cu in Dutch Kills (see Section 4.4.3.1 Figure 4-57, Section 4.4.3.2 Figure 4-61, and Section 4.4.3.3 Figure 4-65).

9. Pages 475-478, Section 8.4.3 Surface Water:

    a. Second paragraph (top of page 476): The text suggests that there is limited spatial variation for TPAH, TPCB, or Cu concentrations in surface water. While this is generally true for Cu, there is an apparent overall increasing trend for TPAH and TPCB in an upcreek direction. Include this overall trend in the narrative.

b. CM 0–2 bullet: It is stated that East River surface water contaminant concentrations are higher than Phase 2 reference areas "likely in part because the four Phase 2 reference areas were selected by USEPA specifically because they exhibited lower surface sediment concentrations than the other Phase 1 reference areas." The Phase 2 reference areas were selected based on an evaluation of multiple factors, including to represent a range of industrialization and contaminant inputs. Delete the portion of the sentence that reads "likely in part because the four Phase 2 reference areas were selected by USEPA specifically because they exhibited lower surface sediment concentrations than the other Phase 1 reference areas." The CM 0–2 bullet also states that concentrations measured in sediment and surface water in the Phase 2 reference areas represent a lower bound estimate of regional background for the NYC urban region as a whole. Delete this statement as it is not substantiated by the data presented in the RI report. The final sentence of this section states "Along with ongoing sedimentation, this will act to reduce surface sediment concentrations over time." Change "will" to "is expected to" to avoid a definitive presupposition about this outcome.

10. Page 483, Section 8.5.2.1 Point Sources and Overland Flow: Revise the text to note that these loads and percentages are estimates to be refined as work on the site FS and associated CF&T continues.

11. Page 484, first paragraph, last sentence: "East River water mixes with the waters of upper New York Harbor and Long Island Sound, so it contains nearly the full suite of urban chemical contamination associated with the NY/NJ Harbor urban estuary." The chemical contamination associated with the NY/NJ Harbor estuary is vague and has not been defined in the RI. Revise the sentence as follows: "East River water mixes with the waters of upper New York Harbor and Long Island Sound. It contains chemical constituents associated with those water bodies."

12. Sections 6.4.5.2, Section 8.5.2.3, Section 8.6.1.3, and Section 9.1 pages 512-513 "Groundwater": It is premature to conclude that groundwater-borne COPC loadings have a negligible impact on the Study Area. FS-stage CF&T modeling and analysis must be conducted before making such a conclusion. The assumptions and analysis-approaches supporting this RI conclusion needs to be reevaluated during the FS CF&T modeling efforts, which should include interaction with EPA for discussing and agreeing to the conceptual basis elements, the adjustments to assumed values, and the sensitivity analysis thresholds needed. Results of the CF&T modeling will be discussed with EPA to determine whether they will be incorporated into the final RI report or presented in the FS.

13. Page 491, Section 8.6.1.3 Subsurface Sediment Fate and Transport Processes, first bullet: Revise the text to read as follows: "Lower concentrations in surface sediment as compared to subsurface sediment at many locations in the Study Area."

14. Page 501, Section 8.7 Bioaccumulation, Risk, and Exposure Pathways, first bullet under Reference Areas: Add the following sentence to end of bullet: “No individual COPCs have estimated cancer risks above the USEPA acceptable risk range, and PCBs and dioxins/furans are the only COPCs with an HQ above the noncancer hazard threshold of 1.”

15. Page 501, Section 8.7 Bioaccumulation, Risk, and Exposure Pathways, first full paragraph after bullets, second sentence: Change the beginning of the sentence from “COPCs in the species consumed by people…” to “A portion of the COPCs in the species consumed by people…”

16. Page 506, Section 8.8 Summary, fifth sentence: “As demonstrated in this report, the RI data are sufficient to develop this CSM, which provides the basis for the developing remedial alternatives in the FS.” Revise the sentence as follows: “As demonstrated in this report, the RI data were used to develop this CSM, which will be updated as the RI/FS progresses.

Figures

17. Figure 8-2. Revise Figure 8-2 to include:

    - Surface water and sediment exposure and volatile inhalation for angler
    - Surface water and subsurface sediment exposure and volatile inhalation for construction worker
    - Porewater as a pathway for invertebrates
    - Surface sediment to fish
    - Surface sediment to bird
    - Surface water to birds
    - Mammals, along with lines from sediment/surface water/invertebrates/fish to mammals

Section 9 Conclusions

General Comment

1. Section 9.2: The discussion of COPCs in this section includes only the primary contaminants TPCBs, TPAHs, and Cu without any mention of the other contaminants that contribute to risk as described in General Comment No. 1. Where applicable, include a summary of the other risk contributors in this section.

Specific Comments

1. Page 511, Conclusions, Fate and Transport Processes, first paragraph, fourth sentence: Revise the text to read as follows: "Historically, contaminant loads to the surface sediments were likely much greater, as evidenced by the higher contaminant concentrations at the many locations in subsurface sediment."

2. Page 511, Conclusions, Fate and Transport Processes, fourth paragraph, first sentence: Revise the text to read as follows: "A key finding of the RI is that contaminant concentrations in the surface sediment layer have likely generally been declining over time."

3. Section 9.1 pages 512-513, Section 9.2 Groundwater and Sections 6.4.5.2, 8.5.2.3, and 8.6.1.3: It is premature to conclude that groundwater-borne COPC loadings have a negligible impact on the Study Area. FS-stage CF&T modeling and analysis must be conducted before making such a conclusion. The assumptions and analysis approaches supporting this RI conclusion needs to be reevaluated during the FS CF&T modeling efforts, which should include interaction with EPA for discussing and agreeing to the conceptual basis elements, the adjustments to assumed values, and the sensitivity analysis thresholds needed. Results of the CF&T modeling will be discussed with EPA to determine whether they will be incorporated into the final RI report or presented in the FS.

4. Page 517, Section 9.2 Reach-Specific Summary, first paragraph, first sentence: This sentence cites mixing due to biological activity (bioturbation) within the surface sediment as an influence on the nature and distribution of contamination in surface sediment. Revise the document to discuss empirical site-specific evidence supporting the extent and scale of bioturbation as a mechanism influencing surface sediment mixing.

5. Page 517, Section 9.2, Reach-Specific Summary, CM 0–2. The text reads as follows: "The range of surface water concentrations of TPAH, TPCB, and Cu in CM 0–2 overlaps with the range of concentrations measured outside the Study Area in the East River." Clarify in the text where in the East River the samples being discussed were collected as samples collected in the East River near the mouth of Newtown Creek could be influenced by materials exiting the creek during an ebb tide.

6. Page 517, Section 9.2 Reach-Specific Summary, CM 0–2, third item, last sentence: Revise the sentence as follows: "The East River source in CM 0–2 is sufficiently dominant such

that sediment concentrations in this reach are likely to be similar to the East River and reference water bodies influenced by similar CSO, municipal, and industrial stormwater discharges."

7. Page 518, Section 9.2 Reach-Specific Summary, third bullet and key findings text box, second bullet: The text states: "Toxicity to benthic macroinvertebrates and risks to other ecological receptors such as fish and crab are similar to the four Phase 2 reference areas." This statement is not consistent with or supported by the BERA. The four reference areas all had different responses in the laboratory toxicity studies. Fish and crab tissue contaminant of potential ecological concern (COPEC) concentrations were widely variable between the Study Area and the four reference areas. Delete this text or revise it to reflect the comment.

8. Page 519, Section 9.2 Reach-Specific Summary, Tributaries: Revise the text to read as follows: "Concentrations of some chemicals in surface sediment decline toward the heads of the tributaries, likely due to mixing of solids and contaminants from upstream and downstream sources and differences in settling rate between fine- and coarse-grained solids."

Appendix Bi Phase 2 Data Summary Report

Specific Comment

1. Attachment F (URI.55): The comment response reads as follows: "Field duplicate results were treated as exaggerated, and nondetects were treated as zeroes during the evaluation in Phase 1; however, no data were qualified due to field duplicate results alone. This was a limitation of the automated data validation software (ADR) used for some Phase 1 data. This software was not used during Phase 2, and field duplicates were evaluated as stated in the QAPP. Due to the significant effort required to reevaluate field duplicates when there are no impacts to the data, no further action will be taken." The response does not adequately address the comment. Provide an explanation of the specific software limitation for Phase 1 data validation described in the response in Appendix Bi under Section 2.2.3 Precision.

Appendix Bii FS Data Summary Report Part 1

Specific Comments

1. Page 12, Section 2.3.1 Systematic Data Quality Issues (NCG ID No. 277 and 328): This section should include the discussion of whether POC correction is needed for point source samples. The point source POC data are biased low compared to EPA split sample results. EPA directed the NCG to use a stepwise approach for adjusting the POC data and evaluating its impacts on modeling and point source loading estimates (e.g., use of adjusted and unadjusted data in sensitivity analyses). Include a discussion of the POC data and the path forward for the sensitivity analyses.

Tables

2. Table Bii3-2: Vertical Hydraulic Gradient results for NC338SP do not match the source table—Table 1 from the U.S. Geological Survey (USGS) report in Appendix Bii-B1 Groundwater. Resolve this inconsistency or explain the discrepancy in the document.

3. Table Bii4-1: This table lists 62 shoreline sediment samples, but Table Bii2-3 has 59 samples. Resolve this inconsistency or explain the discrepancy in the document.

4. Table Bii4-2: Provide a note indicating the reason for the lower sample count for Aldrin.

5. Table Bii4-3: The table lists 10 samples collected from eight locations, but Table Bii2-3 lists nine samples collected from nine locations. Resolve this inconsistency.

6. Table Bii5-2 and Bii5-3: These tables have a total of 42 samples (7 + 35) if all sample fractions are counted, or 21 samples (7 + 14) if they are combined. This is not consistent with Table Bii2-3 (20 samples). Resolve this inconsistency or explain the discrepancy in the document.

7. Table Bii5-3: Rename the table to include porewater in the title.

8. Table Bii5-4: Provide a note indicating the reason for the higher sample count for total solids analysis.

9. Table Bii5-5: Provide a note indicating the reason for the lower sample count for sulfate.

10. Table Bii5-8: Clarify the days visual observations were collected versus the days that observations were planned. Accompanying text Section 5.4.1, end of third paragraph: State the objective of the visual observation time frame (i.e., during the flux chamber deployment period) and how many days of the total deployment were actually observed.

11. Table Bii5-10: Provide a note indicating the reason why extractable petroleum hydrocarbons (EPH) analysis was conducted on seven of the eight samples and not on all eight samples.

12. Table Bii5-12: Provide a note indicating the reason why isotope analysis of carbon dioxide was performed on three of the eight samples and not on all eight samples.

Attachments

13. Attachment Bii-A: Deviation Memorandums in this attachment should include all deviations relevant to the activities presented in the data summary report (DSR). This includes Deviation Memorandums Nos. 1, 2, and 3 and deviation forms 4-4, 4-5, 4-6, 4-11, 4-12, and 4-13 from Deviation Memorandum No. 4.

Figures

14. Figure Bii6-1: Include figures with both Creek Mile 1.7 and English Kills areas scaled to more clearly present the locations.

Appendix Biii Data Usability Assessment Report

1. Page 3, Section 1.2.1 TOC in sediment: "The laboratory reanalyzed all Phase 1 sediment samples using the correct procedure and obtained usable data." This statement is incorrect. Only 559 of the 793 Phase 1 samples were reanalyzed. Section 4 states that a multiplier (1.56) was developed using the 559 paired original and reanalyzed Phase 1 archived samples and then applied to the 234 original Phase 1 TOC data for which archived samples were unavailable. Revise the text accordingly.

2. Section 1.2.1 Systematic Data Quality Issues: Include a discussion of the Aroclor data correction for Phase 1 samples.

Appendix C NAPL

General Comment

1. While the revised RI includes a more expansive discussion of sheens, the distribution of sheens should be discussed as part of the NAPL assessment discussions. For example, the first sentence on Page 6, Section 1.3 states that “NAPL was not observed in Dutch Kills or Whale Creek sediment” but fails to mention that sheens were observed in both tributaries.

2. In some instances, the approach used to categorize visual observations of NAPL is not applied consistently. For example, photos of NC342SG sediment grab sample collected during the FS Part 1 Gas Ebullition Pilot Study show a layer of NAPL is present in the sediment and an iridescent sheen. The sediment is sufficiently saturated with NAPL to result in NAPL running down the spoon. The field notes categorize this visual observation as “blebs.” Two of the attempts for NC342SG resulted in saturated visual observations; the RI instead notes sheen for four of the five attempts and blebs for one (draft RI Table C3-3). Revise the text and figures to reflect the comment.

Specific Comments

1. Page 5, Section 1.3 Program Summary and Key Findings, Category 1B bullet: EPA disagrees with the revised definition of Category 1B. Revise the bullet to exclude “discontinuous” because the categories are based on shake test results that do not provide continuity of information on their own. Multiple lines of evidence are required for an assessment of continuity/discontinuity of NAPL.

2. Page 9, Section 2.1.1 Phase 1 Field Methods for Describing Visual Observations, second paragraph, third sentence: The text reads as follows: “due to the lack of relationship between Phase 1 and Phase 2 visual observations to support the use of the Phase 1 visual observations in defining NAPL, the Phase 1 visual observations are not included in the evaluation of NAPL in Section 5.” Phase 1 visual observations need to be included in Section 5 discussions to provide a complete picture of all the RI data. While Phase 1 visual observations cannot be directly linked to the presence or absence of NAPL, they can still be used as an additional line of evidence to understand site conditions. Revise the section accordingly.

3. Page 31, Section 3.3 RI and FS Part 1 Sheen and NAPL Observations, last paragraph, first sentence: The text reads as follows: “In general, visual observations of potential NAPL in sediment were consistent with shake test results.” Provide the total number of visual observations that are consistent/inconsistent with shake test results to support this statement.

4. Page 34, Section 3.3.2 Subsurface Sediment, Dutch Kills bullet: It is inappropriate to include the CSO and point source discussion here because other sources are not mentioned for the rest of the surface sediment NAPL observations listed in this section. Revise this bullet by removing the CSO and point source related text.

5. Page 40, Section 3.3.3 Native Material: A discussion of NAPL observations in Whale Creek is missing from the bulleted list in this section. Include a bullet point for Whale Creek NAPL observations.

6. Page 44, Section 4.1 Factors that Affect NAPL Mobility: This section lacks any discussion of ebullition as a process that may mobilize NAPL. Revise the text to discuss ebullition as a process that can mobilize NAPL in sediment.

7. Page 44, Section 4.1 Factors that Affect NAPL Mobility, first bullet, first sentence: The text reads as follows: "NAPL must be interconnected within the larger pores to be mobile." Mechanisms such as ebullition have the ability to mobilize NAPL even if pores are not saturated. Revise the text to provide clarification that this discussion is specific to the ability of the NAPL to advect as a nonaqueous fluid phase.

8. Page 46, Section 4.2.1 Initial Screening Based on Frozen Core Photography, last paragraph: Provide citations for the discussion of PAH fluorescence.

9. Page 52 Section 4.4.1 FS Part 1 Core Photography: Add text to this section describing what each of the different fluorescence colors observed indicate.

10. Page 53 Section 4.4.1.1 Frozen Core Photography Observations for Sediment, first paragraph, last sentence: The text reads as follows: "It is possible that the dispersed minute specks of fluorescent material observed in all the unfrozen sediment core photographs may represent OPAs." Delete this sentence or provide additional information that supports why it is believed that fluorescent specks observed are oil-particle aggregates (OPAs).

11. Page 61, Section 5.1 NAPL Evaluation Approach (NRI.195): The sentence "Dynamic processes that may mobilize or transport NAPL and sediment…these include vessel traffic, surface water flow, and navigational dredging." Revise this sentence to include ebullition in the list of dynamic processes.

12. Page 63, Section 5.1.1 Data Used in the NAPL Evaluation, fourth paragraph, third sentence: The text reads as follows: "The methods and terms used to classify visual observations during the National Grid investigations were generally consistent with the Phase 2 methods and terms for classifying visual observations of potential sheen and NAPL." Add text to this paragraph discussing terms that were not consistent and how they were addressed in evaluating visual observations. For example, how was the National Grid observation of hydrocarbon sludge classified.

13. Pages 68-70, Section 5.3.3 Further Evaluation: EPA disagrees with the use of the phrase "more substantial NAPL impacts" to reference Category 2/3 conditions. Revise all such text to limit the characterization to Category 2/3 NAPL.

14. Page 72, Section 5.3.4 NAPL Mobility in CM 0–2 Category 1B Areas, first paragraph, last sentence: The text reads as follows: "These findings are consistent with the visual observations of NAPL in CM 0–2, and are consistent with the Category 1B Evaluation conclusion that NAPL, where present in these areas, is limited and immobile." Results

from the NAPL mobility evaluation in other Category 1B areas are not available yet; therefore, this conclusion is premature. Revise this sentence to limit the discussion to CM 0–2 results.

15. Page 74, Section 5.4.1.1 Step 1 Identify the Presence of Category 2/3 NAPL Observations and Collect Additional Information (NRI 213): There are sheen observations in all three shake tests above the 3 cm point in NC262SC-A and a visual observation on the core of sheen. Revise the text in Appendix C, Section 5.4.1.1 to note these sheen observations.

16. Appendix C, Page 75, Section 5.4.1.1 Step 1 Identify the Presence of Category 2/3 NAPL Observations and Collect Additional Information (NRI214): It is acceptable to update interpretation of NAPL migration based on the results of the EPA-approved FS NAPL mobility and gas ebullition investigations. Revise the text in Appendix C, Section 5.4.1.1 to mention the contiguous NAPL visual observations from the sediment surface, past the shake test sample depth, and into the native material for core NC048CSC.

17. Page 79, Section 5.4.1.3 Summary of CM 1.7 Category 2/3 NAPL Evaluation and Mobility Assessment, second paragraph, last sentence. The text reads as follows: "Like the NAPL mobility findings for the CM 0–2 Category 1B Areas, NAPL in the CM 1.7 Area is present at relatively low saturations that are insufficient to produce NAPL mobility." Provide clarification for what "relatively low" means (i.e. relative to what metric).

18. Pages 81-88, Section 5.4.2.2 Step 2 Characterize the Extent of Category 2/3 NAPL Observations: There are laterally continuous Category 2/3 observations between GPEC-GT14 and NC075SC-A that are not considered. Revise the text in Appendix C, Section 5.4.2.2 to include these observations.

19. Page 82, 5.4.2.2 Step 2 Characterize the Extent of Category 2/3 NAPL Observations, third paragraph (cross section 2), last sentence: The text reads as follows: "Variability in the distribution of visual observations relative to the sediment/native material interface elevations suggests that the observations are laterally discontinuous." Revise the text to include the range of variabilities observed relative to the sediment/native material interface. This also applies to similar text in the first paragraph on Page 83 and last paragraph of Page 85.

20. Page 83, 5.4.2.2 Step 2 Characterize the Extent of Category 2/3 NAPL Observations, first paragraph, third sentence: If the evidence to reach a conclusion about NAPL continuity is not available, it needs to be clearly stated and the phrase "likely discontinuous" needs to be removed. This comment applies to all other instances where there is insufficient evidence to reach conclusions regarding NAPL continuity.

21. Page 84, Section 5.4.2.2 Step 2 Characterize the Extent of Category 2/3 NAPL Observations, cross section 4 (NRI.247): The text on GPEC-SB110 indicates that the NAPL at approximately −50 feet elevation is laterally discontinuous. The support for this statement is unclear when the core to the west (GPEC-SED03) and all the cores east of GPEC-SB10 terminate at elevations less than −45 feet. Provide more information to support the conclusion that deep native material is laterally discontinuous.

22. Page 84, 5.4.2.2 Step 2 Characterize the Extent of Category 2/3 NAPL Observations, second paragraph, second sentence: The text states that cores GPEC-GT14 and GPEC-SB111 showed no visual evidence of potential NAPL. Based on Figure C5-16d, GPEC-GT14 and GPEC-SB111 indicate that saturated NAPL was observed. Revise the text to reflect the comment.

23. Page 89, Section 5.4.2.3 Summary of Turning Basin Category 2/3 Evaluation and Mobility Assessment, last paragraph, fourth sentence: The text reads as follows: "The depth of the NAPL in the deep native material limits the potential for exposure of deep NAPL to the shallow sediments and surface water. The absence of NAPL in the 7 to 28.5 feet of native material that separated the NAPL in the upper portion of the native material and the deep native material provides evidence that the deep NAPL has not moved upward and is not moving upward." The discussion of NAPL mobility is not adequately supported. The NCG's responses to draft RI report comments repeatedly state that assessments of mobility will be finalized after FS NAPL mobility results are available. Conclusions regarding NAPL mobility for cores beyond CM 2 should be deleted from the text until data from NAPL mobility testing are available and have been evaluated.

24. Page 90, Section 5.4.3.1 Step 1 Identify the Presence of Category 2/3 NAPL Observations and Collect Additional Information (NRI.252): Revise the text in Section 5.4.3.1 to include observations of oil-coated sediment near the top of EK004ASC. Phase 1 visual observations need to be included in discussions as an additional line of evidence.

25. Page 95, Section 5.4.3.2 Step 2 Characterize the Extent of Category 2/3 NAPL Observations, cross-section 2. The text states that: "Category 2/3 NAPL was not observed in sediment or native material in the cores on this cross section." Multiple intervals of sheens and oil-stained sediments were observed in these cores. The Phase 1 visual observations need to be included in discussions as an additional line of evidence.

26. Page 96, Section 5.4.3.2 Step 2 Characterize the Extent of Category 2/3 NAPL Observations, cross-section 5: The text states: "However, Category 2/3 NAPL observations were not present in the collocated core." The collocated core (EK006SC-C) was not deep enough to encounter the Category 2/3 NAPL observations in EK006SC-D. Revise this sentence in the cross section 5 discussion in Appendix C, Section 5.4.3.2.

27. Page 103, Section 6 Conceptual Site Model and Summary of NAPL Evaluation: The section discusses a CSM for NAPL in the Study Area but does not mention that during anchoring, dredging, bulkhead repair, etc. NAPL could be mobilized and can migrate to the surface water. Revise the text to include a discussion of such anthropogenic activities that can mobilize NAPL.

28. Page 103, Section 6.1 Conceptual Site Model and Summary of NAPL Evaluation: This Section should state that the evaluation of NAPL data is not complete. A more complete CSM for NAPL should be presented in the FS when all NAPL mobility data are available, processes such as ebullition-facilitated NAPL migration have been evaluated, and CF&T processes have been evaluated and modeled.

29. Page 104, Section 6.1.1 Discharges to the Study Area, first paragraph: The historical and current upland operations should not be limited to 2014 information. Information through 2018 should be included in the report. In addition, draft RI Table C5-1 is incomplete. For example, for the Greenpoint former manufactured gas plant, the only historical potential sources identified are spills and underground storage tanks while the ongoing source is "NA." There is a boom deployed at the site to contain oily seeps. Oily seeps have also been documented at Pratt Oil works, Manhattan Polybag, and Morgan Oil Terminal. Revise the table and text to reflect up-to-date information.

30. Page 105, Section 6.1.1 Discharges to the Study Area, first bullet, last sentence: The text states that sheen and residual NAPL can be found in sediment at the heads of tributaries near several of the CSO outfalls. This is not entirely accurate because residual NAPL is not found ubiquitously near the heads of tributaries as shown in Figure C3-1. Revise the text accordingly.

31. Page 107, Section 6.1.2 NAPL Nature and Extent in Study Area Sediment and Native Material, first paragraph, third sentence: There is insufficient evidence to support the statement that historical discharges of NAPL to the creek have "likely been deposited as oil particle aggregate (OPA)." Revise this sentence to clarify that this may be the case because the likelihood of this mechanism has not been evaluated.

Figures

32. Figure C5-18: Since there are no cores between GPEC-SB114 and GPEC-GT20, adjust the Category 2/3 boundary to go from GPEC-SB114 to GPEC-GT20 instead of splitting up the area boundary. This also applies to identical Figure 4-101 in the RI report figures.

33. Figure C5-20h: The document does not clearly acknowledge the presence of continuous NAPL bodies in the area even though there is a laterally continuous layer between cores EK104SCA, EK094SC-A, and EK103SCA. Revise the text in Appendix C, Section 5.4.3.2 to include this discussion.

34. RI Figures C5-13a and C5-14, CM 1.7: The Category 2/3 extent polygon should pass through NC232SC-I and NC358SC-I and not NC281SC-A. NC281SC-A is an inappropriate core to use in bounding Category 2/3 observations because the recovery interval for this core is not at the same elevation as the Category 2/3 impacts in either NC050ASC or NC262SC-A.

35. Figures C5-16d and C5-17 Turning Basin: Cores with impacts at sediment-native interface should not be used to bound Category 2/3 impacts. For example, both GPEC-SED20 and GPEC-GT22 have a saturated interval, which starts at the sediment-native interface, and both are used to bound Category 2/3 observations in soft sediments. The extent of category 2/3 cores should be extended beyond these cores.

Appendix D Gas Ebullition Evaluation

Specific Comments

1. Page 1, Section 1.1 Background, 1st bullet and Section 1.2, Page 3: Revise the text to note the purpose of the FES as noted in the Phase 2 Field Sampling and Analysis Plan – Volume 2 Addendum No. 4, which reads as follows:

    - Observe surface water for visual evidence of gas ebullition and document observations
    - Develop a preliminary understanding of the site conditions where gas ebullition is most likely to occur
    - Observe surface water for the presence of static and blossoming sheens, visually characterizing sheens, and identify potential sheen sources
    - Visually characterize sheens associated with gas ebullition or otherwise observed in the survey areas

2. Page 5, Section 2.1, last sentence: Edit the text (e.g., as a footnote) to note the amount of organic matter found in the referenced non-CSO-impacted coastal sites and identify those portions of the site where organic matter amounts exceed this level. When discussing site organic matter exceedances, also note whether those exceedances occur in surface or subsurface sediments.

3. Page 19, Section 3.2.2, second paragraph**:** The control sampler used for the study had openings along its length, which allows NAPL migrating because of ebullition next to (but not below) the flux chamber to be captured. Revise the text to read as follows: "This allows differentiation between NAPL/contaminants that originate in the water column (potentially also including NAPL/contaminants released from ebullition that did not occur directly below the flux chamber) from those originating from gas ebullition below the flux chamber."

4. Page 27, Section 4.2 NAPL/Contaminant and Gas Flux Study Results: The intention of pilot scale study was to identify approaches for the quantitative FS ebullition investigation, and any quantitative discussion of ebullition-facilitated NAPL and/or contaminant transport should be provided in the FS when the empirical results from the two quantitative ebullition studies are also presented. However, relevant flux chamber data from the pilot study should be clearly presented in the RI for context in interpreting conclusions of the pilot study. Revise the appendix to include tables of the quantitative analytical and sampling results (i.e., mass of measured contaminants, gas volumes) to support the associated text discussions in Section 4.2.

5. Page 34, Section 5.1.1.1 Organic Material Inputs, including footnote 4: Delete the carbon 14 (14C) discussion from this section and from elsewhere in the RI report. During the planning process, EPA indicated that the 14C data were not necessary to support

evaluation of the gas ebullition pilot test and recommended that the 14C data not be collected. The discussion in the text does not support that 14C the data are relevant to the understanding the nature and extent of contamination or the gas ebullition pilot test results.

6. Page 40, Section 5.2.2 Effect of NAPL/Contaminant Transport on Surface Water Chemistry: The discussion in this section is based on pilot study results and the ebullition field surveys. The ebullition pilot test was designed to support a decision for the best method to use for the full-scale ebullition study. The surface water data should be presented and evaluated in the FS, where the full FS ebullition study dataset will be presented and evaluated. Delete Section 5.2.2 from the text and any similar discussions from elsewhere in the RI report.

7. Page 42, Section 5.5.2.1 Collection Methods, third paragraph: Clarify that the gas tents and sheen frames were positioned close to but not directly over the top of the near-bottom flux chambers.

Figures

8. Figure D5-1: Revise the figure to include:

    - Arrows to more clearly show NAPL spreading across the water surface
    - NAPL droplets settling downward from the water surface after spreading
    - Partitioning on to suspended sediment particles after dissolution

    Also remove the note concerning “approximately 1 m in depth” as site-specific empirical evidence that ebullition is limited to the top meter of the sediment bed has not been presented to EPA. Note in the text that the site-specific depth of ebullition occurrence has not yet been established by EPA.

Appendix E Point Sources

Specific Comments

1. Page 3, Section 1.2 Objectives of the Point Sources Evaluation, first paragraph, second sentence: “This involves evaluating point source and overland flow chemical concentrations and in-creek surface water, surface sediment, and subsurface sediment chemical data to develop an understanding of the role of ongoing sources to current and future contamination in the Study Area.” Revise the text in this paragraph to acknowledge that COPC concentrations in surface water and sediment of the creek are also influenced by other current and historical sources/processes (e.g., East River, groundwater discharge, ebullition). These other sources need to be considered when evaluating point source and overland flow chemical data with respect to surface water and sediment chemical data.

2. Page 16, Section 2.1.3.1 2015 NYCDEP Point Source Model: Point source loads for CSOs and MS4s should be provided for individual years, not for a period of 5 years which NCG considers to be representative. The CF&T model is being developed for a 21-year period from 1991 to 2012. Rainfall is available for all individual modeled years. The use of more detailed input data will yield more robust analyses.

3. Page 28, Section 2.2.2.3 Bulk Water Samples, second paragraph: Delete the words “coarse sediment” as an example of what gets excluded from the bulk water samples. Bulk water data show that the grain size distribution (GSD) is not different from the whole water data sample, and footnote 26 does not identify coarse sediment covering the intake holes during sampling.

4. Page 35, Section 3.1 Estimated Flow Volumes, second Paragraph:

    a. The text does not appropriately represent the magnitude of precipitation in 2011. 2011 did not have “relatively” high precipitation; it is the wettest year on record at La Guardia Airport (LGA) since records began in 1940. The next wettest year was 1983 at 60.8 inches. At Central Park, 2011 had extraordinary precipitation, with the second highest total since 1869. It is also inappropriate to state that the 5-year (2008–2012) period is representative of typical conditions as the 5-year precipitation is at the 83rd percentile among 5-year periods beginning in 1963 at LGA and at the 85th percentile for Central Park. Revise the text to provide a more appropriate representation of the magnitude of 2011 precipitation and 5-year precipitation for the period from 2008 to 2012. This comment also applies to Section 4.1.1 CSO and Stormwater Flows.

    b. There is no rationale for focusing on a single year from the past 53 years. The NYSDEC-approved LTCP uses 2008 as the standard rainfall year. The appendix should be revised to provide a range of loads from all point sources, not just CSO and MS4s, for years over which the CF&T model will be developed, instead of the proposed approach, which includes a very high rainfall year for estimating only annual CSO and MS4 loads.

5. Page 49, Section 4.1.1 CSO and Storm Flows, first paragraph; Page 74, Section 4.3 Summary of Variability and Potential Uncertainties Point Source Load Estimates, second paragraph, first sentence; and page 84, Section 6, third paragraph: Appendix G, Section 3.9 identifies uncertainty in CSO flows as ±30%, but text says ±25%. Resolve this inconsistency and revise the text accordingly.

6. Page 49, Section 4.1.1 CSO and Storm Flows, second paragraph: Explain in the text the significance of using the 53-year period, beginning 1963, to confirm that the 2008 through 2012 period is representative of typical precipitation conditions. LGA has digital hourly records since 1948 and daily data since 1940; Central Park has an even longer period of record.

7. Page 49, Section 4.1.1 CSO and Storm Flows, second paragraph and Figure E3-1: Explain why Figure E3-1 is for Central Park, whereas Figure G3-19 and all discussion in RI Appendix G is for LGA. Central Park receives 5 inches more precipitation per year than LGA. The implications of this difference for the analyses should be discussed in the text.

Appendix F Groundwater

General Comments

1. The draft RI Tier 1 estimation of the groundwater budget should be made more consistent with the Tier 2 and Tier 3 analyses and thus with the seepage metering data.

a. The USGS (Misut and Monti) groundwater flow model is used appropriately in Appendix F, Section 4.1 to simulate the capture zone of the MTA Marcy/Crosstown dewatering, as shown in RI Figure F4-1. However, in Section 5.1.1.1, the model is used in a generalized way to assess groundwater recharge, where an average of the recharge simulated for the entire model is used in Figure F5-1 as a data point in the graph of recharge to impermeable cover. However, because the Misut and Monti model uses geographically varied recharge, including specific values for the Newtown Creek groundwater recharge area, those values should be considered in the development of tier-based estimates/comparisons and in selecting the range of values for conducting sensitivity analyses.

b. The draft RI assumes, based on Buxton and Shernoff 1995, that New York City water mains and sewers contribute two-thirds of the recharge to groundwater. Besides NYCDEP providing information that annual surveys of water mains only find about 1 million gallons per day (MGD) of water leakage (draft RI footnote 18 of Appendix F dismisses this information without reason[2]), fluoride data collected by the USGS show that it is highly unlikely that two-thirds of the groundwater originates from leaking water mains and sewers. In accordance with Article 141.08 of the New York City Health Code, New York City has fluoridated the water in its system to 1 milligram per liter (mg/L) since 1964. The USGS has collected groundwater samples from wells throughout Brooklyn and Queens and analyzed them for fluoride for decades. Fluoride is a generally conservative tracer, which like chloride, requires extraordinary measures to remove from water. If the city water mains and sewers were contributing two-thirds of the groundwater recharge, the groundwater should have a ubiquitous fluoride concentration significantly higher than natural background/detectability and approaching 1 mg/L. However, data from the USGS show that at almost all locations, fluoride is undetected or near undetected (less than 0.2 mg/L).

[2] Although the available NYCDEP annual reports over many years show that leakage from water mains at any given time is only about 1 MGD, the draft RI Appendix F footnote 18 states: *"Information on NYC's water conservation program is publicly available. However, details regarding potential recharge to the groundwater aquifer as a result of water main leaks are not included in this information to assess its applicability to estimating artificial returns in the PGCA."* However, the annual reports document that there is at most 1 MGD of leakage from water mains determined from system surveys; given this documented quantification of leakage from water mains, the draft RI should not rely solely on the value estimated in Buxton and Shernoff, which is based on a single letter from the Jamaica Water Supply Company in the early 1980s.

Specific Comments

1. Page 33, Section 3.7.2.1, and RI Section 6.4.1 and subsequent sections utilizing calculations: These sections describe estimation of dissolved-phase concentrations for TPAH and TPCB to be utilized in contaminant loading calculations. The method selected uses a site-specific K_d that was calculated using data generated in the upper sediment layers. This is not appropriate for estimating the dissolved phase concentrations in native materials. These estimated concentrations, which feed into groundwater loading calculations, should be based on Koc rather than K_d because of differences such as OC content, soot carbon content, and NAPL of the native materials compared to the upper sediment layers. Revise the calculations and subsequent RI report sections, figures, and tables that use the estimated concentrations or use both methods for calculating estimated dissolved concentrations. If both methods are used, the results and subsequent use of those results in loading calculations must be presented as ranges of values in the RI. The contributions of chemicals from groundwater discharge in the Study Area will be further evaluated as part of the chemical fate and transport model that is under development for the FS.

2. Pages 60 and 61, Section 5.1.2.3, Tables F2-2 and F5-9, pages 60-61 and Section 5.1.3 on pages 61-62: The impact on the Tier 1 groundwater balance from the wastewater collection system should be based on more recent investigations and reporting than the Greeley and Hansen (1982) report. By incorporating more recent reporting by/for the NYCDEP regarding infiltration and inflow (I/I), it is likely that the Tier 1 water balance will be more in line with the results from Tier 2 and Tier 3. Revise the RI accordingly.

3. Sections 5.3.3.1.2 and 5.3.3 on pages 74-75, and Table F5-13: Significant variations and some ranges in Tier 3 groundwater flow related estimates of calibrated hydraulic conductivity and transmissivity and equivalent recharge, including large contrasts from segment to segment, need to be resolved. For example, the equivalent recharge estimates range from 0.69 to 25 inches per year, and the calibrated hydraulic conductivity estimates range from 7.6 to 210 feet per day even though the segments' characteristics do not appear to vary over such wide ranges. The contrasts are especially evident when comparing certain segments that are adjacent to each other yet their land cover and hydrogeologic characteristics are similar.

Attachment K

4. Section 2.4 Boundary Conditions: This section indicates that a specified head boundary was used to represent the water table and lays out the process for developing that boundary.

    a. General: Explain why the existing potentiometric surfaces, developed and documented in Appendix F (Section 4), were not used.

    b. Page 6: The text indicates that within 500 feet of the creek, a specified head boundary at the water table was replaced by a specified flux boundary to prevent model artifacts. The report should document the flux simulated along this 500-foot length of specified head boundary. Explain how this flux compares to the flux assigned to the other portions of the cross section.

    c. Page 6, second paragraph: This paragraph indicates that the specified head boundary is replaced by a specified flux boundary.

        i. Provide further explanation about why the specified head boundary was replaced with a specified flux boundary. Discuss how this impacts the sensitivity analysis.

        ii. Provide the flux and equivalent recharge rates for each cross section. Discuss how they compare with recharge rates calculated for the segments with other approaches in the report.

5. Page 9, Section 3.1 Groundwater Discharge to the Creek: This section shows that the discharge to the creek is based on 10 equal sections of the wetted perimeter. This approach means that the vertical seepage faces are varying percentages of the segments nearest the shoreline. Explain how the seepage in each one of these segments is split between the vertical seepage face and the creek bottom.

6. Section 3.1 Groundwater Discharge to the Creek, Model 1 negative seepage rate, Cross-section 1: Forcing drawdown on the Queens side conflicts with the water table mapping within the tier approach, which shows discharge from groundwater in that area, thus, conflicting with the USGS seepage value at NC273SP. Provide other information sources and corresponding data that support a negative seepage rate in this area.

7. Page 11, Section 3.2 Recharge Rate in Upland Areas, last sentence: This sentence states that the simulated recharge rates in the cross-sectional models are generally similar to the Tier 3 equivalent net recharge rates. However, in several cases, the differences between the values are factors of two or more. Delete the last sentence and add a discussion that puts the recharge rates into context according to expected ranges of recharge based on the upland land uses or regional calculated recharge rates. Add a discussion describing how variations in overall recharge would impact the models and estimated seepage calculations. These discussions are important because they should also trigger similar discussions in the RI report due to widening the range of the estimated values of overall flux and mass loading to the Newtown Creek Study Area.

Figures

8. Figures F-K-7 through F-K-27: Add horizontal and vertical scales on these cross section figures.

9. Figures F5-13 through F5-18: The pattern of saline surface water impacts on groundwater affected by induced infiltration is not as clear as would be expected; therefore, it is unclear whether induced infiltration is as strong and widespread along this reach of the Study Area. The RI should address the possibility that induced infiltration may only affect a portion of the reach along which the RI now assumes induced infiltration is occurring. Also, it is difficult to evaluate how impacted are the monitoring and extraction wells with higher values of chloride, salinity, and specific conductivity because the red-colored ones have such a broad range of values.

Appendix G Final Modeling Results Memorandum

Model Codes/Inputs/Outputs

1. The model codes/inputs/outputs transmittal includes what appears to be interpolated input files for the propwash submodel at varying frequencies (1, 2, 5, 10, and 15 seconds), of which the 15-second input was used for the majority of the simulation period from 1999 to 2012. However, the FMRM text does not mention the frequency of input. Revise the FMRM text to mention this.

2. The inputs for the propwash submodel uses 15-second inputs for the majority of the years and months. However, month 11 in year 2003 and month 12 in year 2009 use 2-second inputs. Revise the FMRM text to provide the rationale for this choice of inputs.

3. Review of model output files shows that average cohesive fraction (for each row of cells across Newtown Creek) at the end of the 1999–2012 calibration simulation in the first 0.2 mile of the Study Area is as little as 16%, which is inconsistent with the average measured cohesive content shown in Figure G5-22 (~80%). Revise the FMRM text to include a discussion of such differences between model and data, whether this is indicative of any artifacts in the model performance, and whether this can be expected to affect the performance of the CF&T model.

4. Review of the model code shows that morphological changes calculated due to erosion/deposition over the course of the model simulation are not propagated to the propwash model. However, such morphological changes are included in the Approximate Geomorphic Feedback Method implemented to adjust hydrodynamic forcings (bed shear stress) as a function of morphological change. One potential consequence of not having such a feedback in the propwash model is that erosional areas may continue to erode forever, and depositional areas may continue to deposit forever. Revise the model code to include such feedback in the propwash submodel and apply for the calibration simulations.

General Comments

1. There is a recurring typographical error in the text. The word settable is used instead of settleable. Review and revise.

2. Some analyses included in the attachments to Appendix G have not been referred to in the text in Section 5 of Appendix G. These include Attachment G-I and Section 1.2 of Attachment G-L. Revise the text in Section 5 of Appendix G to include a reference to these analyses and how these analyses have informed model development and application.

3. Despite complexity and degrees of freedom, the propwash resuspension model has a negligible effect on model calculations of reach-scale NSRs, fine sediment bed content, and TSS.

The calibration, validation, and relative importance of the propwash resuspension model (Section 5.5 of the updated FMRM) are overstated. A more apt statement is that on a reach-scale basis, propwash resuspension had a negligible effect on model-predicted NSRs, fine sediment bed content, and TSS. Given the number of assumptions and control variables inherent in the propwash resuspension submodel, calibration and validation of the submodel are not well constrained because the submodel effects are inconsequential to these reach-scale measures and are well within limits of data uncertainty and model uncertainty without propwash resuspension. Revise the text for a more balanced discussion of the parameterization, calibration, and relative importance of the propwash submodel.

4. While a tremendous amount of work has gone into the development of the sediment transport model, the values of certain parameters (e.g., settling velocity of the fine sediment size class) required the use of values that are not usually measured for flocculated sediments in estuarine waters. This, along with the issues described below, indicates that the sediment regime in the East River and Newtown Creek is not being correctly characterized. As such, the sediment transport model is subject to significant sources of uncertainty that can impact the chemical fate and transport model. The following two problems were also considered in arriving at this assessment.

   Excessive sedimentation near the confluence of the East River and Newtown Creek
   The propwash model was compiled in debug mode and then run for 5 years to ensure that no errors occurred. No compilation or run-time errors occurred. The sediment transport model was run in production mode using the NCG's continuous 1999–2012 run template. Analysis of the results showed that excessive sedimentation (approximately 2.3 meters of net deposition) was simulated to occur in the navigation channel near the mouth of Newtown Creek. Interestingly, this excessive sedimentation occurred in model runs both with and without invoking the hard-bottom assumption in the East River. In fact, the analysis performed showed that even more sedimentation is simulated to occur at the mouth when the model is run without the hard bottom. These results are not physically realistic and thus must result from the numerical scheme used to connect the East River and Newtown Creek. This unrealistic model result should be further investigated.

   In EPA's opinion, the impact of the excessive sedimentation on the long-term model future projection simulations cannot be estimated. As such, EPA's recommendation is that whatever is causing the excessive sedimentation at the mouth needs to be corrected because it is a numerically induced problem. It causes completely unrealistic results near the mouth of Newtown Creek and should not be ignored because of a seemingly minor impact on the CF&T model.

   Propwash Model
   In general, the propwash model is a highly empirical and not thoroughly tested routine. As an example, one of the many empirical parameters included in this routine is H_PROP_TIP_MIN. This parameter seems to limit the distance between the bed and the propeller tip to the value of this parameter. Why was it necessary to add this empirical parameter that appears to minimize the impacts of propwash erosion?

The uncertainties associated with the propwash model's predictions would be difficult to quantify. Thus, the uncertainty that is carried forward from the sediment transport model to the CF&T model is mostly unknown. This needs to be considered when ultimately interpreting the results from the bioaccumulation modeling.

The testing that the NCG has initiated to investigate the impact of not having the morphologic feedback activated in the propwash model on the CF&T model is essential and should be thoroughly reviewed by EPA.

Revise the text to include additional detail on how the settling velocity inputs were established, how it compares to values in similar systems, how it compares to literature values, how it compares to the settling velocities of primary particles estimated from the water column GSD data measured in Newtown Creek, and if any bias exists, how it may impact the CF&T model. Similarly, revise the text to include a discussion of the uncertainties in the propwash model described above and in the specific comments and how these uncertainties may impact the CF&T model.

Specific Comments

1. Page 4, Section 1.2 Study Objectives, third bullet in list at top of page: Revise the list to include other sources included in the CF&T model such as ebullition and the implicit loadings from subsurface NAPL.

2. Page 4, Section 1.3 Utility and Application of the Model, bullet list: Revise the list to include groundwater inflows since that source is included in the hydrodynamic model.

3. Page 7, Section 2.1.1 Overall Modeling Framework, first complete bullet, second-to-last sentence: The phrase diagnostic analysis at the end of the sentence seems to be a typographical error. Review and edit as appropriate.

4. Page 7, Section 2.1.1 Overall Modeling Framework, second complete bullet, last sentence: Revise the list to include other sources included in the CF&T model such as ebullition and the implicit loadings from subsurface NAPL.

5. Page 10, Section 2.1.4 Sediment Transport Model, third sentence in third paragraph: Revise the reference to the 2016 FMRM model to include the 2019 FMRM model.

6. Page 31, Section 3.5.1 Diagnostic Analysis of 2015 Geo-Neutral Point Source Model, second paragraph, fourth sentence: "The annual rainfall measured at this station for the 27-year period from 1990 to 2015…" Measurements are of total precipitation, not just rainfall. Revise accordingly. Also revise the duration to 26 years.

7. Page 31, Section 3.5.1 Diagnostic Analysis of 2015 Geo-Neutral Point Source Model, second paragraph, fifth sentence: "The average annual rainfall at LGA…" should be average annual precipitation. Revise accordingly.

8. Page 31, Section 3.5.1 Diagnostic Analysis of 2015 Geo-Neutral Point Source Model, second paragraph, fifth sentence: "The average annual rainfall at LGA for the 5-year period evaluated in the diagnostic analysis (2008 to 2012) was 47.2 inches per year, with

minimum and maximum values of 36.2 and 65.3 inches per year in 2012 and 2011, respectively." It should be noted that these are statistics for the hourly dataset, which has deficiencies relative to the daily dataset. The 5-year average in the daily dataset was 47.4 (ftp://ftp.ncdc.noaa.gov/pub/data/ghcn/daily/all/USW00014732.dly). The 2012 total was 36.7, not 36.2. In Table G3-1, the 2010 total also differs (40.6, not 40.3). Revise the text and Table G3-1 accordingly.

9. Page 36, Section 3.5.1 Diagnostic Analysis of 2015 Geo-Neutral Point Source Model, second full paragraph, second and third sentences: "…13% of the precipitation for the entire watershed falls on these subbasins." "If 75% of the rainfall on the stormwater and direct drainage subbasins is discharged to the creek, then that volume of water would represent 11% of the total rainfall for the entire watershed." 13% × 75% = 10%, not 11%. Revise the text accordingly.

10. Page 37, Section 3.6 Model Application, second paragraph, second sentence: Average precipitation for 1999 to 2012 is 46.0 inches as stated in the hourly dataset but was 47.2 inches in the daily dataset. Hourly datasets are notably deficient nationwide from about 1996 to 2005, corresponding with the early years of the automated surface observing system (ASOS) program. For this period, average annual precipitation in the hourly dataset was 43.6 versus 45.6 inches in the daily dataset. Simulations based on LGA hourly data should first include quality control and adjustment to ensure agreement with the daily dataset. Revise accordingly.

11. Page 37, Section 3.6 Model Application: Explain why the 23-year period from 1990 to 2012 is referenced. Figure G3-19 shows annual precipitation for 1990 to 2015. It is confusing enough to report statistics for 1999 to 2007, 1999 to 2012, and 2008 to 2012 without needing to also include this 23-year period. Explain why the 23-year period is needed.

12. Page 38, Section 3.6 Model Application, equation G-1: Identify the units for ETP and RA.

13. Page 39, Section 3.6 Model Application, first paragraph: "The Hargreaves and Samani (1985) paper also provides the equations for the calculation of the extraterrestrial radiation as a function of the time of day and latitude." Day should be replaced with year. Explain if the daily PET values were used as inputs to the model. Revise accordingly.

14. Page 39, Section 3.6 Model Application, first paragraph: Text says that evapotranspiration is 34.9 inches. Our calculation indicates 35.9 inches per year using the Hargreaves equation as implemented in EPA stormwater management model (SWMM) 5.1.013, with an annual range from 3 to 38 inches. Check the calculation and revise the text accordingly.

15. Page 39, Section 3.7.1 Specification of Sensitivity Simulation Scenarios; Section 3.7.2 Sensitivity Simulation Results; Section 3.9 Conclusions; Tables G3-5 and G3-6; and Figures G3-35 to G3-39**:** Through an input sensitivity analysis, the draft RI characterizes the variability in point source model outputs associated with user-defined changes to model inputs. The sensitivity analysis does not constitute an uncertainty analysis. Further, it is unclear how the reported ± 25% effect of the parameterization of the geo-neutral point

source model on discharge volumes was obtained from the input sensitivity analysis presented.

a. In Section 3.7, as referenced in Sections 4.1.1 and 4.3 of Appendix E, the referenced Section 3.7 presents a sensitivity analysis to user-defined changes to model inputs, not a quantification of uncertainty in the model. The conclusions of the sensitivity analysis as presented in Sections 3.7 and 3.9 of Appendix G, Table G3-5, and Figures G3-35 to G3-39, indicate that variations of the model inputs for rainfall source, runoff coefficient, and sanitary inflow yielded + 30% variation (not uncertainty) in predicted annual discharge volume (Appendix G, page 42 and page 46). This result does not agree with a report of 25% uncertainty in Appendix E on pages 49, 74, and 84. Reporting of point source model input sensitivity analysis results should be consistent between Appendix E and referenced sections of Appendix G both in terms of reported percentages and most importantly for correct characterization as variation rather than uncertainty

b. On page 42, a statement is made that variation in runoff coefficient between 0.4 and 0.6 on the low end instead of 0.5 (input variation of ± 20% on the low end) and between 0.6 and 0.8 instead of 0.7 on the high end (input variations of ± 14% on the high end) caused annual discharge volume for total point source discharge to vary by approximately 25%. If this is the result upon which statements in Appendix E on pages 49, 74, and 84 are based, that should be identified in Appendix E. Table G3-6 suggests this result is most descriptive of variation in sitewide CSO annual discharge volume. The draft RI should include a detailed explanation of the evaluation that produced the 25% result to allow for transparency, reproducibility, and assessment; otherwise, the claim of a 25% result should be removed from Appendix E Section 4.1.1 on page 49, Section 4.3 on page 74, and Section 6 on page 84.

16. Page 52, Section 4.2.3 Temperature and Salinity Data, first paragraph in section: There is a discrepancy for the height of the near-bottom sonde described as 1 foot in the text and as 2 feet in Tables G4-5, G4-7, and G4-9. Review and edit as appropriate.

17. Page 57, Section 4.4.2.1 Water Surface Elevation: Describe if the water surface elevation results from the regional model were evaluated against measured water levels at the Battery and Horns Hook (location of the northern boundary) and, if so, the results of this evaluation.

18. Page 59, Section 4.4.3.2 Whale Creek WWTP Treated Effluent Overflow, second-to-last sentence in section: The sentence characterizes the WWTP discharge as primarily due to runoff from the watershed due to rainfall. Revise the text to indicate that the discharge represents treated effluent rather than runoff.

19. Page 60, Section 4.4.5 Groundwater Inflow, last sentence: While it is true that setting negative groundwater inflow to zero has negligible effects on hydrodynamic model predictions, it is unclear how this inflow into the sediment bed will affect the chemical fate model. Add text indicating that this effect will be considered during CF&T model development.

20. Page 63, Section 4.5.1 Calibration Data and Approach: This section discusses the calibration parameters in the model. It presents the final calibrated values for two parameters (bottom roughness and horizontal eddy diffusivity) but not the adjustment of water levels at the East River boundaries. For completeness, also present the magnitude of the adjustment applied as part of model calibration.

21. Page 66, Section 4.5.3 Calibration Results, second sentence: The application of this definition is not clear because the conditions immediately prior to the point source discharges could vary spatially. Address this possibility in the text and indicate how this definition compares with the definition used in the CF&T model for model and data comparisons.

22. Page 68, Section 4.5.3.3.1 Depth-Averaged Current Velocity: Because upward-looking ADCPs do not measure the entire water column profile (there is an unmeasured depth interval near the bottom of the water column and typically a depth interval corresponding to one bin near the surface), the measured profiles need to be extrapolated for an estimate of the depth average velocity. Revise the text to describe if this extrapolation was performed and, if so, the method used. If not extrapolated, then describe if/how the model results were processed for comparison against velocity averaged from the measured depth intervals.

23. Page 70, Section 4.5.3.3.1 Depth-Averaged Current Velocity, second-to-last paragraph in section: Revise the text to mention if the bias and ubRMSD presented in Figures G4-44 and G4-45 are for the Phase 1, Phase 2, or both datasets.

24. Page 70, Section 4.5.3.3.1 Depth-Averaged Current Velocity, last paragraph in section: Revise the text to include the rationale for not assessing model performance using target diagrams for the Phase 2 data. Alternatively, include graphics and text describing such comparisons.

25. Page 70, Section 4.5.3.3.1 Depth-Averaged Current Velocity, last paragraph in section: Model performance for a significant fraction of the comparisons included in the target diagrams for the 34-hour LPF depth-averaged currents in Figures G4-56 through G4-60 falls outside the radius of 1 described in Section 4.5.2 as the threshold within which model predictions are more accurate than simply assuming the mean of the observations. Revise the text to include a discussion of potential impact of these discrepancies on the long-term sediment and CF&T model performance.

26. Page 71, Section 4.5.3.3.2 Vertical Profile of Current Velocity, first complete paragraph on page and Figure G4-66 and G4-67: Review the figure as there are no data plotted after October 7. If the reason is the lack of data, consider showing a different period with model–data comparisons to demonstrate the points described in the text.

27. Pages 73-74, Section 4.5.3.4 Temperature: Low bias in modeled water temperature throughout Newtown Creek is likely associated with heat-flux calculations rather than temperature boundary conditions. Near the mouth of the creek, the elevation gradient specified between the East River open boundaries may account for the low bias in

modeled temperature and the high bias in modeled salinity.

The Newtown Creek hydrodynamic model-calculated water temperature is consistently biased low relative to data. The bias is attributed largely to specification of temperature at the model's northern open boundary, which was based on output from the regional hydrodynamic model. However, careful assessment of the Newtown Creek hydrodynamic model results for temperature and salinity identify two other important factors that should be discussed in the document:

a. While the northern temperature boundary condition obtained from the regional hydrodynamic model output is biased low by 1 to 2°C as compared to measurements at NYCDEP Harbor Survey Stations E2 and E4 in the lower East River, Figures G4-85 through G4-90 show that the low-temperature bias in the Newtown Creek hydrodynamic model increases notably from the creek mouth to the most upstream data station (EK108) in lower English Kills. This increasing low-temperature bias beyond the mouth of Newtown Creek cannot be attributed to the northern open boundary condition and indicates that the Newtown Creek hydrodynamic model's heat-flux calculations require adjustment. Either adjustments to the heat-flux calculation should be investigated or the document should indicate the potential role of the heat-flux calculation in the modeled temperature bias.

b. The Newtown Creek hydrodynamic model has two open boundaries, with temperature for the southern open boundary taken directly from National Oceanic and Atmospheric Administration (NOAA) data at the Battery. Thus, any low-temperature bias at the northern open boundary should be mitigated to some extent by data-based temperature conditions applied at the southern open boundary. In that regard, it has also been observed and remarked on at modeling meetings (see Figure G4-107) that model-predicted salinity near the mouth of Newtown Creek is biased slightly high (~ 0.5 to 1.0 practical salinity unit [psu]), suggesting too much influence of higher salinity water from the upper East River (N.B., the higher-salinity water actually originates in Long Island Sound). The relative influences near the mouth of Newtown Creek of temperature and salinity specified at the two model open boundaries is controlled by the static head difference between the two boundaries, specified in the model as a 3 cm increase in water-surface elevation at the northern open boundary. Thus, decreasing the head difference between the boundaries would decrease the net southward flux of water from the upper East River and might help to reduce both the low-temperature bias and the slightly high salinity bias near the mouth of Newtown Creek. The hydrodynamic model should be run with a decreased head difference between the boundaries.

28. Page 74, Section 4.5.3.4 Temperature, second-to-last paragraph in section: Model performance for the majority of the comparisons included in the target diagrams in Figures G4-95 through G4-106 falls outside the radius of 1 described in Section 4.5.2 as the threshold within which model predictions are more accurate than simply assuming the mean of the observations. Revise the text to include a discussion of the potential impact of these discrepancies on the long-term sediment and CF&T model performance.

29. Page 75-76 and 76-77, Section 4.5.3.5 Salinity: The hydrodynamic model salinity calibration suggests that groundwater discharge may have been underestimated, especially in upstream reaches of the creek. Model-predicted salinity is consistently biased high relative to data. In the draft RI, the bias is attributed to uncertainty in freshwater discharge from the geo-neutral point source model. However, the high salinity bias persists during prolonged intervals of dry weather when model results are not affected by point source discharge. Furthermore, the dry-weather high salinity bias increases slightly upstream from the creek mouth, suggesting a missing source of freshwater to the creek. Discuss the dry-weather bias in modeled salinity, including:

    a. Figures G4-107 through G4-112 demonstrate that the model's 0 to 2 psu high salinity bias persists even during prolonged intervals of dry weather. Hence, this component of the bias cannot be attributed to uncertainty in the geo-neutral point source model. A 2 psu bias is significant and has the potential to affect residual circulation.

    b. It has been observed and remarked upon at modeling meetings (see Figure G4-107) that model-predicted salinity near the mouth of Newtown Creek is biased slightly high (~0.5 to 1.0 psu), suggesting too much influence of higher salinity water from the upper East River (N.B., the higher-salinity water actually originates in Long Island Sound). The relative influences near the mouth of Newtown Creek of salinity specified at the two model open boundaries is controlled by the static head difference between the two boundaries, specified in the model as a 3 cm increase in water-surface elevation at the northern open boundary. Decreasing the head difference between the boundaries would decrease the net southward flux of water from the upper East River and might help to reduce the slightly high salinity bias near the mouth of Newtown Creek. The hydrodynamic model should be run with a decreased head difference between the boundaries.

    c. Figures G4-107 through G4-112 also indicate that the dry-weather high salinity bias increases slightly from creek mouth to head. The dry-weather biases at stations NC310 (CM 0.4) and NC313 (CM 1.5) are similar, approximately 0.5 to 1.0 psu. Stations NC316 (CM 2.25) and NC318 (CM 2.7) bracket the Turning Basin downstream and upstream, respectively. The high salinity biases at those two stations are similar and show a notable uptick from the two downstream stations (i.e., NC310 and NC313). East Branch station EB403 shows a further uptick in the dry-weather salinity bias relative to the Turning Basin stations, particularly near the water surface. A similar uptick is apparent at English Kills station EK108. The dry-weather high salinity biases at these two upstream stations (i.e., EB403 and EK108) are more consistently 2 psu or slightly higher. Taken together, these observations suggest a missing source of freshwater (or "fresher" water) to the model, with the influence of the missing freshwater increasing from mouth to head. A possible candidate for the missing water is a general underestimation of groundwater discharge or an overestimation of groundwater salinity. Hydrodynamic model simulations should be conducted to assess salinity results using increased groundwater discharge and decreased groundwater salinity.

Vertical profiles of salinity measurements (Figures G4-130 and G4-131) at several stations show distinct lower-salinity surface layers 2- to 5-feet thick. While the potential implications of these data have not been fully assessed in the draft RI, comparisons of model results to these measurements implies that the model requires additional groundwater inflow to Newtown Creek, in general, and to East Branch and English Kills, in particular. Include a discussion of these points:

a. Surface salinity for these layers was up to 50 to 80% lower than salinity below the halocline, indicating relatively strong salinity stratification. These fresher surface layers will induce estuarine circulation in which the fresher layer flows downstream at the surface and a more saline layer flows upstream at the bed. Model-predicted vertical salinity profiles at the same times and locations do not show this salinity stratification, indicating that the hydrodynamic model is missing this estuarine circulation. This will have implications to solids and chemical transport, which should be identified in the document.

b. More important, the possibility that the fresher surface layers persist for longer periods of time (i.e., several days) should be considered. Given that the plot panels vary both by time and station location, the persistence of fresher surface layers cannot be fully ascertained from the figures. Nevertheless, the plots provided indicate that a substantial source of fresher water is missing from the model. This fresher water cannot be attributed to point source discharge because the salinity stratification persists at least 2 to 4 days after both rainfall and point source discharge have ceased. As indicated by the model's response, the fresher surface water attributable to point source discharge will dissipate more quickly than this without the presence of a continuing source of fresher water. The implications of additional groundwater inflow to Newtown Creek, in general, and to East Branch and English Kills, in particular, deserve more consideration. Complete additional evaluations and incorporate them into the document.

30. Page 75, Section 4.5.3.5 Salinity, second complete paragraph: Revise the text to discuss the relatively large discrepancy between model and data in Figures G4-107 through G4-112, especially at the surface. The data seem to indicate the impact of a point source discharge event before 10/1/15, whereas the point source model calculates a discharge event only after 10/1/15. As a result, the hydrodynamic model only shows an impact, albeit smaller than the data, only after 10/1/15.

31. Page 76, Section 4.5.3.5 Salinity, first complete paragraph: Model performance for the majority of the comparisons included in the target diagrams in Figures G4-117 through G4-128 falls outside the radius of 1 described in Section 4.5.2 as the threshold within which model predictions are more accurate than simply assuming the mean of the observations. Revise the text to include a discussion of potential impact of these discrepancies on the long-term sediment and CF&T model performance.

32. Page 81, Section 5.1.2 2016 FMRM Refinements, first bullet: Since Primary Technical Issue No. 1 relates to the hydrodynamic model, move this bullet item to an appropriate place in Section 4.

33. Page 89, Section 5.2.1 Multiple Lines-of-Evidence Approach for Evaluating Net Sedimentation Rates, bullet items: In addition to the two findings listed in the referenced text, as described in Attachment G-G, the geochronology analysis also shows the impact of changes in trapping efficiency on NSRs and the impact of propwash resuspension. Revise the text to include these insights.

34. Page 90, Section 5.2.1 Multiple Lines-of-Evidence Approach for Evaluating Net Sedimentation Rates, second and third concluding bullets: The second sub-bullet for both referenced bullets attributes long-term temporal (50 to 75 years) changes in NSRs to only changes in point source loadings. However, the analysis in Attachment G-G also attributes changes in NSRs over this time period to changes in trapping efficiency. Revise the sub-bullets to also mention changes in trapping efficiency as a cause for changing NSRs, consistent with the analysis in Attachment G-G.

35. Figure G5-5: The figure does not show NSR in English Kills estimated from historical dredging records included in Attachment G-H. Revise the figure to either include NSR estimated from historical dredging records in English Kills or provide justification for excluding this estimate.

36. Page 91, Section 5.2.2 Data-Based Mass Balance Analysis: The results of the sediment mass balance analysis described in this section and in Attachments G-I and G-L do not seem to be referenced anywhere else in the text. Revise the text to describe how the results of this analysis have been used to support model development and application and if this analysis can be cited as a line of evidence to support the robustness of the sediment transport model.

37. Page 92, Section 5.2.2 Data-Based Mass Balance Analysis, second paragraph: Provide rationale/analyses to support the statement:" Most of the deposition in the upper tributaries is due to point source sediment loads."

38. Page 93, Section 5.2.3 Bed Property Data, first paragraph in section: Provide the rationale for presenting TOC content data in the context of the sediment transport model.

39. Page 95, Section 5.2.4 TSS Concentration and Turbidity Data, bullet items at end of section and concluding sentence: EPA has previously commented on the TSS−turbidity relationship for the bulkhead sondes as part of the 2016 draft FMRM. Various potential artifacts were identified by EPA that have led to the apparent lack of a relationship between TSS and turbidity. These include fouling of the turbidity sensors, differences in the depth sampled by the turbidity sensor and the TSS water sample collection depth, and location artifacts where the water samples were collected in locations with depths somewhat different than at the sonde locations. Revise the text to mention the potential artifacts that have resulted in an apparent lack of relationship between TSS and turbidity.

40. Page 95, Section 5.3 Development of Propwash Resuspension Submodel: Many aspects of the propwash resuspension submodel are uncertain, and additional effort would be required to address the uncertainty.

The updated propwash resuspension submodel is complex and based on a number of assumptions, making it difficult to assess the value of the approach. Additional efforts should be made to explore the uncertainty of this submodel. Specific issues of concern include:

a. Page 106, Section 5.3.4 Development and Calibration of Empirical Propwash Submodel: Calibration of the empirical propwash submodel takes a probabilistic approach to an assumed log-normally distributed applied power and attempts a qualitative "visual inspection" match between the model-calculated cumulative frequency distribution of UNB,max and the cumulative frequency distribution of UNB,max measured by acoustic doppler velocimeters (ADVs) at six stations (e.g., Figure G5-59 to G5-61). One could argue that the cumulative frequency distribution of UNB,max for a mean of 18% and a standard deviation of 20% (Figure G5-61) looks as good qualitatively as the selected calibration mean of 9% and standard deviation of 10% (Figure G5-59). Submodel sensitivity to these choices should be assessed.

b. Section 5.3.5, Specification of Propwash Resuspension Submodel Input Parameters:

   i. Page 107: Bulleted characteristics of hypothesized Period 1 and Period 2 both use the word "typically," and only a single time series of acoustic backscatter sensor (ABS)-based turbidity is presented (i.e., Figure G5-62). Present more clearly how typical durations of Period 1 and Period 2 were determined and provide supporting statistics.

   ii. Page 108: The general approach for characterizing propwash events is based on a bulleted assumption that "ABS-based turbidity values are a surrogate for suspended sediment concentration." However, FMRM Attachment G-F observed that R2 values for the ABS-turbidity correlations at the six ADV locations ranged from 0.15 to 0.66, suggesting that ABS-based turbidity values are a poor surrogate for suspended sediment concentration. Attachment G-F even concluded with a warning about the limitations of using the ABS-turbidity correlations. Present more clearly in Section 5.3.5 the potential limitations of the general approach to the propwash submodel.

   iii. Pages 108-109: The propwash submodel asserts that Period 1 can be distinguished from Period 2 by an inflection point in slope of the ABS-based turbidity time series, and one example is presented graphically (i.e., Figure G5-63). Describe the quantitative method by which the position of the inflection point is determined.

   iv. Page 109: The empirical propwash submodel makes an assumption that t2-t1 = t1-t0, yet Figure G5-63 would suggest that t2-t1 is notably longer than t1-t0. Present the basis for the submodel assumption. How would submodel results vary if the assumption was modified; for example, t2-t1 = 2(t1-t0) or t2-t1 = 4(t1-t0)?

   v. Page 109: The empirical propwash submodel makes an assumption that 1% of Class 1C-fast sediment remains in the water column at the end of Period 1.

Describe quantitatively the evidence supporting that assumption. How would the submodel results if that assumption was modified; for example, 5, 10, or 20% of Class 1C-fast sediment remains in the water column at the end of Period 1.

vi. Page 110: In equation (G-26), what is the term "CABS,1C-total,0 ABS,1C-total,2"? Show the derivation of equation (G-26).

vii. Page 110: Regarding the selected median values of Ws,1C-fast / Ws,1C-slow = 30 and 0F1C-slow = 50%, are these truly fundamental quantities of propwash resuspension in Newtown Creek or are they merely the consequence of the previous series of assertions and assumptions applied to the propwash resuspension submodel?

41. Page 95, Section 5.3 Development of Propwash Resuspension Submodel, second-to-last bulleted item: While the effect of water depth and its impact on vessel draft is easily understood, the impact of tidal phase (ebb or flood) and dry or wet weather conditions on navigation scour is not apparent. Clarify how these two hydrodynamic conditions can impact navigation scour in Newtown Creek and how these have been accounted for in the development of the propwash resuspension model.

42. Page 99, Section 5.3.2.2 AIS Data Analysis: Historical Data, last paragraph: There is a note explaining the term "ship-days" with reference to Figure G5-37. However, this term does not appear on Figure G5-37 but rather on Figure G5-34. Revise the text to provide explanation of this term in the context of Figure G5-34.

43. Page 104, Section 5.3.4 Development and Calibration of Empirical Propwash Submodel, bullet items: In addition to the two sources of uncertainty listed in the bullets, include the uncertainty in the actual draft of the vessel described in detail on the second paragraph on the page as another source of uncertainty that affects the empirical propwash submodel.

44. Page 106, Section 5.3.5 Specification of Propwash Resuspension Submodel Input Parameters, second-to-last sentence in first paragraph in section: The referenced sentence includes a reference to Attachment G-L for the ABS-turbidity correlations. This seems to be in error; the ABS–turbidity correlations are in Attachment G-F. Revise the text as appropriate.

45. Page 106, Section 5.3.5 Specification of Propwash Resuspension Submodel Input Parameters, second paragraph in section: Revise the text to indicate if propwash events identified from the ADV data were correlated to resuspension events evident in the ABS-based turbidity data. In other words, did every propwash event also show evidence of resuspension? Comment on potential explanations for propwash events that did not induce resuspension.

46. Page 106, Section 5.3.5 Specification of Propwash Resuspension Submodel Input Parameters, second paragraph in section: The wording in the first two paragraphs is confusing. It seems apparent that a propwash event would be caused by resuspension of sediment from the bed and a rapid increase in turbidity. Is this the definition that was

used to determine the number of propwash events? On page 110, it states that there were 476 propwash events, yet only 34 of the events (that had adequate data) were used in the analysis. Revise the text to include more discussion of this difference.

47. Page 106, Section 5.3.5 Specification of Propwash Resuspension Submodel Input Parameters, second paragraph in section: Based on text on page 110 (476 propwash events but only 34 events with evidence of resuspension following the conceptual picture shown in Figure G5-66), it does not appear that every propwash event induces resuspension. This is consistent with observations of vessel-induced resuspension in other systems. For instance, Clarke et al. (2015) found variable patterns of resuspension depending on vessel type and activity—tugs pushing barges did not induce resuspension, whereas tugs assisting ships in rotating and docking maneuvers appeared to induce resuspension. Similar variability was also noted for other vessels (deep-draft versus car carriers). Revise the text to include a discussion of this uncertainty in vessel-induced resuspension.

48. Page 107, Section 5.3.5 Specification of Propwash Resuspension Submodel Input Parameters: The use of ABS-based turbidity data to determine two phases of a propwash resuspension event seems appropriate. Nevertheless, assumptions made during this analysis should be considered far from definitive (e.g., approximately 99% of Class 1C-fast sediment depositing during Period 1, sediment resuspended during an event is composed of only clay and silt-sized material). The result is a model or algorithm that contains a lot of unquantifiable uncertainty. This needs to be discussed in this section of the FMRM.

49. Page 107, Section 5.3.5 Specification of Propwash Resuspension Submodel Input Parameters and Figure G5-63: For clarity, consider adding terms CABS,0, CABS,1, CABS,2, t0, t1, and t2 described in the text to Figure G5-63.

50. Page 107, Section 5.3.5 Specification of Propwash Resuspension Submodel Input Parameters, third paragraph: Revise the text to mention the assumption that all material resuspended by propwash and measured by the ABS-based turbidity is assumed to be comprised of clays and silts.

51. Page 108, Section 5.3.5 Specification of Propwash Resuspension Submodel Input Parameters, first bullet: Revise the text to provide rationale or analysis justifying the assumption that 99% of Class 1C-fast settles out during Period 1.

52. Page 109, Section 5.3.5 Specification of Propwash Resuspension Submodel Input Parameters, first complete paragraph, second bullet, second sub-bullet: The assumption that the duration of Period 1 is same as Period 2 (first numbered item in paragraph) contradicts the empirical observation summarized at the top of page 107 that Period 2 is typically longer than Period 1. Revise the text to reconcile this discrepancy.

53. Page 109, Section 5.3.5 Specification of Propwash Resuspension Submodel Input Parameters, first bullet item and Table G5-5: There is an inconsistency between the first bullet item on page 109 and the first record in Table G5-5. The latter indicates the

quantity Ws,1C-fast/Ws,1C-slow as being in percentage units. This is inconsistent with the former, which is expressed as a unitless quantity. Revise as appropriate.

54. Page 110, Section 5.3.5 Specification of Propwash Resuspension Submodel Input Parameters, paragraph following equation G-26: The text indicates 476 propwash events but only 34 events with evidence of resuspension following the conceptual picture shown in Figure G5-66. Revise the text to clarify model performance; if the model were applied to the period of the Phase 2 propwash monitoring program, would it calculate 476 propwash events and 476 resuspension events? Clarify if the propwash resuspension model is intended to reproduce individual propwash resuspension events in detail or the net integrated long-term morphological impacts of navigation in the Study Area.

55. Page 110, Section 5.3.5 Specification of Propwash Resuspension Submodel Input Parameters: Revise the text to mention the treatment of sands (mainly with respect to settling characteristics) resuspended by propwash.

56. Page 111, Section 5.3.6 Revised Sediment Bed Model for Propwash Resuspension and Figure G5-70: The text in this section and figure refers to a one-layer bed model. Revise the text and figure to indicate if the revised bed layer model preserves the multilayer formulation described in Section 5.4.2 (developed using Sedflume-measured erosion properties). Also indicate if/how this revised one-layer bed layer formulation is integrated with the active-buffer-parent layer formulation used for erosion under hydrodynamic forcings in Newtown Creek.

57. Page 111, Section 5.3.7 Diagnostic Simulations with Propwash Resuspension Incorporated into Sediment Transport Model: Since the diagnostic simulations described by the section heading are not presented in the 2019 FMRM, there does not seem to be a specific reason to include this section. Delete the section.

58. Page 114, Section 5.4.1 Sediment Size Class Characteristics, last paragraph, third sentence: Revise the text to clarify how Class 3 particles informed the Phase 2 field study.

59. Page 114, Section 5.4.2 Bed Properties, first paragraph, third sentence: Provide the rationale and supporting analyses for the hard-bottom assumption for the first row of grid cells at the mouth of Newtown Creek. This is inconsistent with the measured bathymetric change shown in the upper panel of Figure G5-144, which shows patterns of erosion and deposition in this area. This assumption limits the applicability of the model for this section of the Study Area. Specifically, address why it was necessary to assume a hard bottom for this row of cells and why it was only applied to one row of cells and not two or three. It is also stated in the last sentence that a zero settling velocity was used for all suspended sediment in the portion of the grid where the bottom was assumed to be hard. EPA had previously recommended that a model simulation be performed in which a non-zero settling velocity was used for this suspended sediment to allow for a determination of the impact of this unrealistic assumption. The results of this simulation should be presented in this section.

60. Page 114, Section 5.4.2 Bed Properties: Revise the text to clarify if the hard-bottom assumption allows for settling in the water column.

61. Page 115, Section 5.4.2 Bed Properties: Define "A" (and "n") in equation G-27. It was not defined in Attachment G-J either. "A" (and "n") should be defined explicitly as site-specific constants on page 115 along with the definitions of the other terms in equation G-27.

62. Page 118, Section 5.4.3.1.1 East River-Newtown Creek Grain Size Distribution Data Collection and Analysis, first paragraph: Revise the text to include a summary of the analytical protocols—TSS measurements, deflocculation, wet sieving for various size fractions, etc. This will help with interpretation of subsequent text describing how the data were used to support the development of model inputs.

63. Page 119, Section 5.4.3.1.1 East River-Newtown Creek Grain-Size Distribution Data Collection and Analysis, first incomplete paragraph, second-to-last sentence: Revise the text to indicate that the water column samples were analyzed for TSS and solids concentrations corresponding to different size ranges (by sieving). The GSD was a result of the analytical measurements, not the analyte as currently indicated by the text.

64. Page 119, Section 5.4.3.1.1 East River-Newtown Creek Grain-Size Distribution Data Collection and Analysis, first complete paragraph and Figure G5-80: The raw data from the sampling study consists of TSS, and solids concentrations corresponding to the coarse (>62 μm) and fine (<62 μm) fractions. Present in Figure G5-80 the (1) measured TSS concentrations, (2) measured concentrations of the coarse fraction, (3) measured concentrations of the fine fraction, (4) TSS calculated as the sum of concentrations corresponding to the coarse and fine fractions, and (5) comparison of measured TSS and TSS calculated as the sum of concentrations corresponding to the coarse and fine fractions. Revise the text to also include a discussion of the fact that the TSS calculated as the sum of concentrations corresponding to the coarse and fine fractions typically exceeded the measured TSS for a given sample.

65. Page 119, Section 5.4.3.1.1 East River-Newtown Creek Grain-Size Distribution Data Collection and Analysis, first complete paragraph and Figures G5-81 to G5-82: In addition to the GSD shown in Figures G5-81 to G5-82, present and discuss the raw data from the sampling study, which includes concentrations for the various size ranges included in Figures G5-81 to G5-82.

66. Page 119, Section 5.4.3.1.1 East River-Newtown Creek Grain-Size Distribution Data Collection and Analysis, first complete paragraph, first numbered item in fourth sentence and Figures G5-83: The referenced figure and text only consider TSS calculated as the sum of the concentrations corresponding to the coarse and fine fractions. Present a similar figure using the measured TSS and discuss in the text.

67. Page 119, Section 5.4.3.1.1 East River-Newtown Creek Grain-Size Distribution Data Collection and Analysis, second complete paragraph: "The coarse solids content was greater than fine solids content at all sampling locations. Relatively minor spatial variations in coarse solids content (approximately 60% to 70%) were observed in East

River and up to approximately CM 1 in Newtown Creek." The report lacks a clear definition of "coarse solids." What is the composition of coarse solids (e.g. fractions of sand, silt, clay and organic matter)? What class does it fall into? Expand the text to define coarse solids, including composition and classification.

68. Page 120, Section 5.4.3.1.1 East River-Newtown Creek Grain-Size Distribution Data Collection and Analysis, bullet items at end of section: "The GSD data cannot be used to estimate the inorganic sand content at the East River boundaries of the sediment transport model." Explain why. GSD data were supposed to be used to determine East River boundary conditions. How does the limitation in the GSD data affect the sediment transport framework, model runs, and results?

69. Page 120, Section 5.4.3.1.1 East River-Newtown Creek Grain-Size Distribution Data Collection and Analysis, bullet items at end of section: Revise the text to include a summary of the bias between the measured TSS and TSS calculated from the concentrations of various coarse and fine fractions.

70. Page 120, Section 5.4.3.1.1 East River-Newtown Creek Grain-Size Distribution Data Collection and Analysis, bullet items at end of section: Provide direct empirical lines of evidence such as POC, chlorophyll-a, and other relevant data to support the assertion that: "(1) Coarse solids must be organic solids," and "(2) data suggest that an organic bloom was in progress."

71. Page 120, Section 5.4.3.1.2 Use of Surface Water Data Collected on June 18, 2018 to Guide Specification of Sediment Transport Model Inputs, third bullet: Revise the text to describe how the initial estimate for the washload fraction was established as 20 to 30%.

72. Page 123, Section 5.4.3.2 Point Source Discharges, last paragraph: Revise the text to provide the rationale/analyses supporting the lack of any washload input from the point sources.

73. Page 126, Section 5.5.1 Calibration and Validation Process, first paragraph and Figure G5-107: Revise either the figure or the text to be consistent with each other. The figure currently says all metrics were used for calibration, whereas the text says only NSRs were used for calibration, but bed composition and TSS were used for validation.

74. Page 127, Section 5.5.1.1 Stage 1: Model Calibration without Propwash Resuspension, second bullet: Revise the text to reconcile the calibrated washload content of 37% with the empirical estimate of 20 to 30% mentioned in Section 5.4.3.1.2.

75. Page 127, Section 5.5.1.1 Stage 1: Model Calibration without Propwash Resuspension, last paragraph: The settling velocities for classes 1A and 1B (listed as 1 and 3 meters per day [m/d], respectively) and the fractions of class 1B-settleable and class 1B-washload (listed as 61 and 37%, respectively) appears to be inconsistent with values in the model input files. Based on the model input files, settling velocities for classes 1A and 1B are 3 and 2 m/d, respectively, and the fractions of class 1B-settleable and class 1B-washload are 68.6 and 29.4%, respectively. Review and revise the text as appropriate.

76. Page 127, Section 5.5.1.2 Stage 2: Model Calibration with Propwash Resuspension: It is unclear how the calibration parameters (mean and standard deviation of applied power distribution) developed for the spreadsheet-based empirical propwash submodel described in Section 5.3.4 were applied to the propwash submodel in the fate and transport model. Instead, the fate and transport model calibration described in Section 5.5.1.2 introduces two new calibration parameters for the propwash submodel—the maximum relative applied hp and the minimum distance between the propeller tip and the bed. Revise the text to make the connection between the propwash model calibration established in Section 5.3.4 and the application of the propwash submodel in the fate and transport model. Also address the impact of the two additional calibration parameters described in Section 5.5.1.2 on the propwash submodel calibration performance described in Section 5.3.4. In other words, explain how the propwash submodel calibration performance described in Section 5.3.4 is impacted by the two additional calibration parameters described in Section 5.5.1.2.

77. Page 127, Section 5.5.1.2 Stage 2: Model Calibration with Propwash Resuspension: This section needs to be expanded to describe the calibration procedure in more detail. For example, define "optimum model performance." Why were the parameters given in the first set of three bullets chosen for adjustment during calibration the only parameters that were adjusted? ? Why was the sediment resuspended by propwash distributed only over the lower half of the water column? In contrast, anecdotal observations in Newtown Creek of propwash resuspension induced by a sampling vessel indicate sediment plumes at the water surface. Details of these calibration efforts and appropriate sensitivity analyses must be included in the FMRM or as an attachment to the FMRM.

78. Page 127, Section 5.5.1.2 Stage 2: Model Calibration with Propwash Resuspension, last paragraph, including three bullet items: Revise the text to indicate the impact of the constraints listed in the first two bullets on the performance of the calibrated empirical propwash model described in Section 5.3.4.

79. Page 129, Section 5.5.2.1 Model Calibration without Propwash Resuspension: NSRs for 1999 to 2012, first complete paragraph, last sentence: Revise the text to describe how the three listed factors affect the predicted NSRs and the potential artifacts that may have been introduced in the model due to simplifying assumptions, especially for the second and third listed factors.

80. Page 130, Section 5.5.2.3 Model Validation Without Propwash Resuspension: TSS Concentration for 2012 to 2015, and Attachment G-L Sediment Transport Model Calibration and Validation Results (Figures G-L-1 through G-L-28): The sediment transport model underpredicts measured TSS concentrations. The underprediction may not be improved with additional sediment transport model calibration effort. Accordingly, CF&T modeling of particulate phase chemicals in the Newtown Creek water column will require the development of a method to account for or offset the sediment transport model underprediction of TSS. The draft RI must indicate that this need will be addressed during CF&T modeling.

Overall, model prediction (without the propwash resuspension submodel) of TSS data in Newtown Creek was fair to poor (e.g., Figures G5-120, G-L-6, G-L-11, and others). Three figures (G5-133 through G5-135) were provided showing the effect of the propwash resuspension submodel on model-data agreement for TSS, with the overall conclusion that activating propwash resuspension does not notably alter model response for predicting TSS. Therefore, comments below focus on model-data TSS comparisons without inclusion of the propwash resuspension submodel, with the expectation that the comments would remain valid if the propwash resuspension submodel were activated.

a. During dry-weather intervals (Figures G5-120 and G5-121 and Figures G-L-1 through G-L-19), modeled TSS upstream of CM 2 frequently underpredicted TSS data by a factor of 2 or 3 (roughly equivalent to 10 to 20 mg/L), which will have important consequences for fate and transport modeling of chemicals that sorb strongly to solids. Provide discussion of this result and how it will be addressed for chemical fate and transport modeling.

b. Indicate that for dry-weather intervals in which model and data agreed reasonably well (e.g., Figures G5-121 G-L-4, and G-L-17) the agreement was due to a creek-wide reduction in magnitude of the TSS data and not due to a fundamental change in the model response. Good model-data agreement only occurred when the magnitude of the TSS data dropped to the consistently low response level of the model.

c. Indicate that during wet-weather intervals (Figures G5-122 and G5-123 and Figures G-L-20 through G-L-28), the model-predicted the 10th to 90th percentile range was wider (i.e., in response to point source discharge of solids); however, despite the increased range in model TSS concentrations, the overall model-data agreement remained fair to poor, with important consequences for fate and transport modeling of particulate phase chemicals.

d. Interpreting model-data agreement for dry- and wet-weather intervals was confounded by the manner in which the plot intervals were parsed. Interpretation of model-data agreement is confounded by the varying durations of the plot interval. Plot intervals coincided with the durations of various field surveys (see Table G5-16), with surveys varying in duration from 1 to 23 days. Thus, the number of data points in a plot and the variability of those data increased with the duration of the plotting interval. Similarly, the time-averaged model response (mean, 10th percentile, and 90th percentile) also varied over different averaging durations. Provide a description of the effect of varying durations on the comparability of results.

e. The plot-interval parsing method resulted in other oddities. For example, Figure G-L-2 presents a 1-day, dry-weather plot for March 20, 2012. Figure G5-120 presents a 7-day, dry-weather plot for March 19 to 25, 2012. Rightfully, one would expect that the TSS data plotted for March 20 (Figure G- L-2) would be included in the plot for March 19 to 25 (Figure G5-120), but it is not. Including the March 20 data in the plot for March 19 to 25 would have given a very different impression of model-data agreement for the dry-weather interval of March 19 to 25. Include the March 20, 2012 data on the diagram for March 19 to 25 or provide a statement explaining the omission.

f. Designations of dry- and wet-weather intervals also varied by duration of the field surveys rather than by the actual lengths of dry- and wet-weather intervals. Dry-weather conditions were defined when predicted point source discharge was less than 3 MGD when averaged over the duration of the field survey. As a result, overlapping field surveys (and their corresponding model-data comparison plots) can have opposite dry- and wet-weather designations. For example, Figure G-L-10 presents a model-data comparison for the 3-day, dry-weather interval of August 21 to 23, 2012. That interval falls within the 19-day, wet-weather interval of August 13 to 31, 2012, plotted in Figure G-L-22. Thus, it is not clear whether dry- and wet-weather TSS data and the corresponding model responses are parsed and presented in a logical and obvious manner. Address the ambiguities of dry- and wet-period designations.

81. Page 131, Section 5.5.2.3 Model Validation Without Propwash Resuspension: TSS Concentration for 2012 and 2015, bullet list: The report states that there were three primary causes of poor model-data agreement for TSS:

- Specification of temporally constant TSS concentration in the East River
- Specification of temporally constant TSS concentration for point source discharges
- Neglect of internal production of solids via algal production

There are a number of other causes that are potentially as likely that the RI should also identify:

- Specification of GSDs at model boundaries and point sources
- Specification of solids settling speeds
- Specification of bed roughness affecting the magnitude of bed shear stress
- Specification of the critical skin-friction shear stress for deposition
- Uncertainty in the TSS data, which shows relatively high variability both temporally and spatially

82. Page 131, Section 5.5.2.3 Model Validation Without Propwash Resuspension: TSS Concentration for 2012 and 2015, last sentence: This sentence overstates the ability of the sediment transport model (without propwash resuspension) to “reproduce the data-based spatial gradient in fine SSC.” The model results show a decreasing trend in fine SSC from mouth to head, which is a natural consequence of the model kinetics for dry-weather conditions. The SSC data also show a decreasing trend from mouth to head; however, the slope of the averaged model-predicted values (blue line) does not match the slope of the

data values. Moreover, the model's upper 90th percentile values underpredict the SSC data for 8 of 10 cases. The RI needs to acknowledge the underprediction.

83. Page 132, Section 5.5.3.1 Model Calibration with Propwash Resuspension: NSRs for 1999 to 2012: Model-predicted NSRs with the propwash resuspension submodel differ minimally from NSRs without the submodel.

    - To the extent that the EPA calibration ranges (Figure G5-125) reflect reach-scale NSR uncertainty, the differences with and without the propwash resuspension submodel fall well within that uncertainty. Given the number of assumptions and controlling variables inherent in the propwash resuspension submodel, one must conclude that potential calibration of the submodel is not well constrained by the EPA Calibration Ranges. The RI needs to indicate the limitations of NSRs as a constraint on the propwash resuspension submodel.

    - Comparisons of model NSR predictions with propwash resuspension at additional reach scales (Figures G5-126 to G5-129) to similar predictions without propwash resuspension show a propwash-induced reduction in NSRs primarily near the creek mouth (i.e., CM 0–0.5 and CM 0.5–1) and little effect elsewhere. The propwash-induced NSR reductions near the mouth appear excessive. The model-predicted NSRs now fall notably below the error bars of the data-based NSR estimates, whereas previously without the propwash resuspension submodel, the model NSR predictions fell within the data-based error bars. Farther from the mouth, effects of the propwash resuspension submodel are negligible at the various reach scales presented, leaving the calibration of the submodel not well constrained by these data. The RI needs to indicate the limitations of NSRs as a constraint on the propwash resuspension submodel.

84. Page 133, Section 5.5.3.2 Model Validation with Propwash Resuspension: Bed Properties for 1999 to 2012: Comparisons of plotted model results with and without propwash resuspension are inconsistent with the statements made in this subsection:

    - Comparison of Figure G5-130 to Figure G5-117 shows very slight increases in model-predicted fines content for CM 0–2 and CM 2+ with propwash resuspension. The subsection text reports the opposite. Revise per the comment.

    - State that comparison of Figure G5-131 to Figure G5-118 shows very slight increases in model-predicted fines content for CM 0–1 and CM 2+ with propwash resuspension. CM 1–2 shows a barely discernible increase in fines content with propwash resuspension.

    - State that comparison of Figure G5-132 to Figure G5-119 shows a slight increase in model-predicted fines content for CM 0–0.5 with propwash resuspension and a slight decrease for CM 1.5–2. Differences with and without propwash resuspension are indiscernible for CM 0.5–1 and CM 1–1.5.

- Indicate that for all cases the differences in fines content with and without propwash resuspension are minimal and are much smaller than data uncertainty as represented by the wide error bars for the data-based estimates. Thus, it is impossible to ascertain whether including the propwash resuspension submodel represents an improvement to the sediment transport model. Validation of the propwash resuspension submodel is not well constrained by these data.

85. Page 134, Section 5.5.3.3 Model Validation with Propwash Resuspension: TSS Concentration for 2012 to 2015: Differences in model-data TSS comparisons with and without propwash resuspension are barely discernible. Propwash resuspension is infrequent and effects are of short duration; therefore, the likelihood that such an event would coincide with field measurement of TSS is low. Hence, the data do not provide a suitable constraint for validation of the propwash resuspension submodel. Indicate this limitation in the RI. The most discernible differences with propwash resuspension are observed as abrupt increases in model-predicted TSS at approximately CM 3.75 (upper English Kills) in Figures G5-134 and G5-136. This location is approximately one-quarter mile beyond the maximum upstream extent of ship traffic, and the abrupt spikes in model-predicted TSS suggest a modeling artifact or instability of the sediment-transport model when coupled with the propwash resuspension submodel. Include text explaining the model behavior at this location.

86. Pages 134-137, Section 5.5.3.4 Model Validation with and without Propwash Resuspension: Evaluation of Predicted Net Sedimentation Rates at Different Spatial Scales:

    - The description of Figure G5-137 omits an important observation. While the curve of model-predicted NSRs with the propwash resuspension is more variable than without, the trend is frequently in the opposite direction of the data-based NSRs. That is, when data-based NSRs are notably higher than predicted by the sediment transport model without the propwash resuspension submodel, the model-predicted NSRs with the propwash resuspension submodel are even lower (i.e., worse). So while the model-predicted NSRs curve without propwash resuspension shows less small-scale variability, that curve on average is in better agreement with the data-based NSRs than is the model with propwash resuspension. Correct the omission and add the observation.

    - The extremely complex propwash resuspension submodel purports to predict propwash effects mechanistically on the spatial scale of a model grid cell; however, the cumulative distribution plots (Figures G5-138 through G5-143) are not pair-wise model-data comparisons of NSRs for each grid cell. Present pair-wise model-data comparisons of NSRs for each grid cell (e.g., Taylor diagrams). Is the mechanistic propwash resuspension submodel any more accurate on a grid-cell basis than an appropriately scaled random erosion function applied within the navigation channel?

    - The model-predicted cumulative distribution curves for NSRs with and without propwash resuspension are not notably different for cumulative frequency greater than 50%. The primary difference is that the propwash resuspension submodel can result in net negative (i.e., erosive) NSRs, although not necessarily in the correct locations (see previous comment regarding Figure G5-137). However, the issue of net negative NSRs, itself, deserves some consideration. Ships have been trafficking Newtown Creek for several decades. Does it make sense that large areas of the navigation channel remain net erosive at rates of 4 or more centimeters per year (cm/yr) (e.g., Figures G5-144 and G5-145) over the decadal times scales being modeled (i.e., 1999 to 2012)? How much deeper must the navigation channel become before it achieves quasi-equilibrium? One of the principal reasons that data-based NSRs have been evaluated for the project primarily on a reach-scale basis is a general recognition that data-based NSRs assessed on much smaller scales (e.g., model grid scale) introduce unacceptably high uncertainty. Thus, it is a concern that the propwash resuspension submodel may be attempting to reproduce what amounts to small-scale uncertainty (i.e., noise) in the data-based NSRs. Note that this is not a statement that propwash has no impact. The bathymetry data provide clear evidence that propwash scour has deepened the channel in areas of transit and maneuver. Rather, the point is that after several decades of ship traffic, one might expect that the navigation channel has achieved quasi-equilibrium between solids deposition and propwash scour on annualized or longer time scales and that net-negative data-based NSRs on small spatial scales may be dominated by data uncertainty. Incorporate text to address these issues.

87. Page 137, Section 5.5.3.5 Comparison of Sediment Transport Model Predictions of NSRs with and without Propwash Resuspension, and Figures G5-144 and G5-145: Clarify the source for the data-based NSRs presented in the upper panels of the referenced figures. Is it 1991 to 2012 or 1991 to 2012 in the main stem and 1999 to 2012 in English Kills? Also comment on the lack of data-based NSRs in the other tributaries.

88. Page 137, Section 5.5.3.5 Comparison of Sediment Transport Model Predictions of NSRs with and without Propwash Resuspension, and Figure G5-145: Review of Figure G5-145 does not show a good spatial correspondence between the measured and model-calculated NSRs. Some prominent examples include:

    a. The model does not reproduce the erosional pattern at the mouth of the creek. Instead, the model calculates deposition of approximately 8 feet in the navigation channel (NSR of approximately 15 cm/year). This magnitude of NSR is inconsistent with the measured NSR seen in Figure G5-137. This magnitude of deposition is also inconsistent with the measured bathymetric change over the 1999–2012 period. This is also an unrealistic result since such a magnitude of deposition would represent a navigation hazard preventing the entry of vessels into Newtown Creek.

    b. Instead of the measured depositional signal both inside and outside the navigation channel between CM 0.1–0.5, the model calculates relatively little deposition outside the navigation channel and erosion inside the navigation channel.

    c. The model does not reproduce the measured erosional signal within the Turning Basin.

d. The model does not reproduce the measured erosional signal within English Kills.

Revise the text to include a discussion of these differences between model and data, potential explanations for these differences, and anticipated impacts on the performance of the CF&T model.

89. Page 138, Section 5.5.3.5 Comparison of Sediment Transport Model Predictions of NSRs with and without Propwash Resuspension, first paragraph: Revise the text to describe how the left, middle, and right portions of the creek were defined. Was this based on a spatial overlay with the federal navigation channel?

90. Page 138, Section 5.5.3.5 Comparison of Sediment Transport Model Predictions of NSRs with and without Propwash Resuspension: For Figures G5-153 through G5-156: What is the relevance of a ΔNSR14-year based on grid-scale comparison of model predictions with and without propwash resuspension? Provide a discussion.

91. Page 140, Section 5.6.1.2 Diagnostic Analysis: Relative Effects of East River and Point Source Sediment Loads and Figures G5-160 and G5-161: East River solids represent nearly 65 to 100% of deposited solids in CM 0–2+, greater than 80% in Dutch Kills and Whale Creek, and up to 50% in portions of East Branch and English Kills. Revise the text to mention this.

92. Page 140, Section 5.6.1.2 Diagnostic Analysis: Relative Effects of East River and Point Source Sediment Loads and Figures G5-160 and G5-161: Regarding the influence of East River solids, the word "dominate" is too subjective and should be avoided. One could argue that East River solids dominate deposition from the mouth through the entire Turning Basin (i.e., CM 0–2+) because those solids represent 65 to nearly 100% of deposited solids through that reach. Section 5.6.1.2 should state that the fraction of East River solids in the bed exceeds 80% in both Dutch Kills and Whale Creek. Further, the RI should indicate that in sections of East Branch and English Kills, up to 50% of the depositing solids are from the East River.

93. Page 146, Section 5.6.3 Diagnostic Analysis of Direct Geomorphic Feedback: In the last sentence in the first paragraph, the text states: "were evaluated by incorporating direct feedback between the hydrodynamic and sediment transport models." Presumably, "direct feedback between" means the adjustment of the local grid cell water depth and horizontal current speeds based on the change in calculated bottom elevation in the cell. If this is correct, it is incorrect to refer to this as "direct feedback between the hydrodynamic and sediment transport models" because the hydrodynamic and sediment transport models are not dynamically linked. If not that, was it achieved by running hydrodynamics and sediment transport in the same simulation with the bathymetry updated in the model using morphological changes calculated by the sediment transport model every timestep, or was it accomplished by some other numerical scheme? Revise the text to describe how the direct geomorphic feedback was accomplished.

94. Page 149, Section 5.7 Conclusions, sixth bullet: Deviations between predicted and data-based NSRs for Maspeth Creek and East Branch are attributed solely to uncertainty in the

magnitude and composition of point sources, whereas the text on page 129, Section 5.5.2.1, last sentence in first complete paragraph on the page describes additional factors that may explain the deviation. Revise the text to include the additional factors mentioned previously.

95. Page 150, Section 5.7 Conclusions, last bullet: In the last bullet, change the statement "the primary causes of poor model-data agreement" to "some of the possible causes of poor model-data agreement." The four factors listed are not the only possible causes and were not definitely proven to be "the primary causes" in the FMRM.

96. Page 150, Section 5.7 Conclusions, last bullet: In addition to the factors listed in the referenced text, an additional factor that may affect model−data comparisons for TSS is the temporally constant assumptions for settling velocities and solids composition at the boundaries (point sources and open boundaries). Revise the text as appropriate.

97. Page 150, Section 5.7 Conclusions, last sentence in section: At best, the wording of the last sentence on this page should be changed to "Thus, the sediment transport model is deemed to be appropriate for use in developing and calibrating the chemical fate and transport model." Consistent with the statement in the General Comments section, the sediment transport model (including propwash) is subject to significant uncertainties that can impact the chemical fate and transport model.

98. Page 163, Section 7.3.2 Sediment Transport Conceptual Site Model, first paragraph, third sentence: This is the first mention anywhere in the text on the atypical vertical gradients in TSS during wet-weather versus dry-weather periods. Revise the text in Section 5 to elaborate on this feature and add supporting figures.

Tables

99. Tables G5-3 and G5-4: The referenced tables seem to duplicate the same information; both tables summarize the number of propwash events as seen in the identical numbers presented in them. Review and revise in case these were intended to present different information. If not, delete one of these tables and revise any associated text.

100. Table G5-15: For clarity, revise the headings for the third and fourth columns. The third column appears to include values from the 2016 draft FMRM, whereas the fourth column appears to include values from the 2019 draft FMRM. The existing column headings are somewhat confusing in this regard.

101. Tables G-3 and G3-4: These tables should be combined. G-4 has several issues on its own and should be revised as follows:

    a. Area column should be to the left of the frequency column.

    b. The event counting method is suspect. Based on a 12-h interevent time and an event threshold of 0.0-inch, there were 91 storms per year from 2008 to 2012. With a 0.1-inch threshold (the smallest storms do not produce CSO), there were 60 storms. The count of 106 events at NC-083 suggests that overflows include multiple reported events per actual storm and/or a short interevent time specification. Check the event counting method and revise Table G3-4 accordingly.

c. CSO reduction at NC-015 from 560 to 330 million gallons (Mgal) is a 41% decrease, not 43% as reported.

d. CSO reduction at NC-077 from 560 to 520 Mgal is a 7% decrease, not 5% as reported.

Figures

102. Figure G3-1: The text identifies NYCDEP as “Department of Environmental Conservation.”

103. Figure G4-130: Indicate that examination of NOAA rainfall data at Central Park and LGA shows that rainfall began 4/1/2012 at 16:30 and ended 4/2/2012 at 02:00.

    a. The plot panel for EK022 shows a distinct fresher surface layer on 4/4/2012 at 08:53, approximately 2 days and 7 hours after rainfall ended.

    b. The plot panel for EB010 shows a distinct fresher surface layer on 4/5/2012 at 08:28, more than 3 days and 6 hours after rainfall ended.

    c. The plot panel for MC008 shows a less-distinct fresher surface layer on 4/6/2012 at 08:16, more than 4 days and 6 hours after rainfall ended.

104. For Figure G4-131: Indicate that examination of NOAA rainfall data at Central Park and LGA shows that rainfall began 4/22/2012 at 10:30 and ended 4/23/2012 at 08:00.

    a. The plot panel for NC059BC shows a distinct fresher surface layer on 4/24/2012 at 13:46, approximately 1 day and 6 hours after rainfall ended.

    b. The plot panel for EB008BC shows a distinct fresher surface layer on 4/25/2012 at 13:14, more than 2 days and 5 hours after rainfall ended.

105. Figures G5-138 to G5-143 – Increase the upper bound on the y-axis so that all model results are plotted. A minor subset of cells included in Figures G5-138 and G5-139 has NSRs greater than the highest y-axis value of 10 cm/yr. Also revise Figures G5-140 to G5-143 for consistency.

106. Figures G5-138 to G5-143: Judging by the difference in horizontal extents for the data- and model-based distributions, it appears that the model results might be presented for a larger spatial area than the data-based distribution, which is missing coverage in some areas such as portions of CM 0−0.1. Review the data- and model-based distributions to ensure only cells with data-based NSRs are presented in all three distributions presented in Figures G5-138 to G5-143. This will ensure consistent comparison of model and data. Update the summaries presented in pages 135 and 136 accordingly.

Attachments

107. Attachment G-F, Page 1, Section 1.1 Correlation Analysis of Turbidity and TSS Concentration Data: EPA has previously commented on the TSS−turbidity relationship for

the bulkhead sondes as part of the 2016 draft FMRM. Various potential artifacts were identified by EPA that have led to the apparent lack of a relationship between TSS and turbidity. These include fouling of the turbidity sensors, differences in the depth sampled by the turbidity sensor and the TSS water sample collection depth, and location artifacts where the water samples were collected in locations with depths somewhat different than at the sonde locations. Revise the text to mention the potential artifacts that have resulted in an apparent lack of relationship between TSS and turbidity.

108. Attachment G-F, Page 1, Section 1.1 Correlation Analysis of Turbidity and TSS Concentration Data, second paragraph, fourth sentence: The referenced sentence states that "a reliable correlation between turbidity and TSS concentration data does not exist." This implies that turbidity measurements cannot be used to infer TSS. This contradicts the implicit assumption behind the analyses in Appendix G, Section 5.3.5, which use ABS-based turbidity as a surrogate for TSS, and infers propwash resuspension, temporal trends in TSS, and the presence of solids classes of varying settling characteristics from the turbidity time-series. If a reliable correlation between turbidity and TSS does not exist as asserted, then ABS-based turbidity cannot defensibly be used to infer TSS and support the parameterization of the propwash resuspension submodel. Reconcile the aforementioned statement with the analyses presented in Appendix G, Section 5.3.5.

109. Attachment G-F, Page 5, Section 1.3 ADV and Near-Bottom Turbidimeter Data Collection and Analysis, last full paragraph, last sentence: The sentence states that the ABS-turbidity correlations were not sufficiently reliable for quantitative use due to the low R2 values. However, this is in contrast to the analyses in Appendix G, Section 5.3.5, which use ABS-based turbidity quantitatively to assess the relative difference in settling velocities and the relative fractions of the two fine sediment classes resuspended by propwash. Reconcile the aforementioned statement with the analyses presented in Appendix G, Section 5.3.5.

110. Attachment G-G, Page 21, Section 1.3.14 Phase 1 Core MC001, first paragraph: Based on similar text for other cores, the text in parentheses in the first sentence should appear at the end of the second sentence instead. Review and revise as appropriate.

111. Attachment G-H, Table G-H-2: The area-average NSR for Maspeth Creek in Table G-H-2 seems wrong. Comparison to Table G-H-3 suggests that the value in Table G-H-2 is only for Area 1 in Maspeth Creek rather than the entire tributary. Revise the table as appropriate.

112. Attachment G-H, Page 5, Section 1.2 Differential Bathymetry Analysis: 1991 to 2012, last paragraph in section: Revise the text to include a discussion and explanation of the erosional signal measured over 1999 to 2012 on average in Area 1 (as seen in Figure G-H-46) and over a significant portion of Area 3 (as seen in Figure G-H-45).

113. Attachment G-H, Page 5, Section 1.2 Differential Bathymetry Analysis: 1991 to 2012, last paragraph and Figure G-H-48: As described in the analysis of geochronology data presented in Attachment G-G Section 1.3.14, core MC001, which is located in the vicinity of Area 2, is considered to have been impacted by changes in transport processes (e.g.,

decreases in point source sediment loads, decreased trapping efficiency due to geomorphic feedback). The existing text in this section discusses only changes in point source loadings as an explanation for the temporal change in NSRs. Revise the text to also discuss potential changes in trapping efficiency as a cause of changing NSRs, similar to the findings in Attachment G-G Section 1.3.14.

114. Attachment G-H, Page 5, Section 1.2 Differential Bathymetry Analysis: 1991 to 2012, last paragraph, last sentence: Similar to the impact of changes in trapping efficiency on NSRs noted in several of the geochronology cores presented in Attachment G-G, changes in trapping efficiency may have also impacted NSRs over the 1991 to 1999, and 1999 to 2012 period. It is not clear how changes in NSRs over these two periods can be solely attributed to temporal changes in point source loadings. Revise the text to provide the rationale for attributing changes in NSRs over 1991 to 1999 and 1999 to 2012 solely to temporal changes in point source loadings or include a discussion of changes in trapping efficiency that may have also caused a change in NSR.

115. Attachment G-I, Page 1, Section 1, first paragraph, second sentence: Revise the text to state the implicit assumption involved in this analysis that temporal changes in NSRs during 1991 to 2012 are solely related to changes in point source loadings.

116. Attachment G-I, Page 1-2, Section 1, paragraph starting on page 1 and first complete paragraph on page 2, and Figures G-I-2 through G-I-7: The analyses presented for English Kills and East Branch are based on NSRs calculated over the entire tributary rather than Areas 1 to 3 in English Kills and Areas 1 to 4 in East Branch (areas as defined in Attachment G-G). Revise the text to include a note to this effect or revise the analyses and Figures G-I-2 through G-I-7 using the NSRs tabulated in Attachment G-G, Tables G-H-1 and G-H-3. If choosing the latter option, also update Figures G-I-11 through G-I-13.

References

Clarke D., K.J. Reine, C. Dickerson, C. Alcoba, J. Gallo, B. Wisemiller, and S. Zappala. 2015. “Sediment Resuspension by Ship Traffic in Newark Bay, New Jersey.” Prepared for U.S. Army Corps of Engineers, ERDC/EL TR-15-1, April 2015.